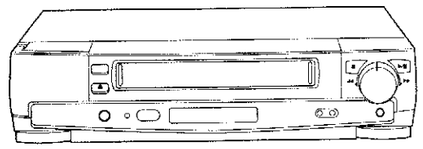
HITACHI

SERVICE MANUAL



TK | No.4721E

VT-DX815A

US MECHANISM

This model uses a US Mechanism. Refer to the following manuals for the US Mechanism.
The US mechanism currently used in the VT-DX815A has been partially changed from that described in the following manual. See Chapter 2 for details.

Manuals to be referred.

Name of manual	Manual No.
US Mechanism	4527E

D-VHS CTP2 NTSC

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

VIDEO CASSETTE RECORDER

October 1997 Image & Information Media Systems Division, Tokai

SAFETY PRECAUTIONS

NOTICE:
Comply with all cautions and safety related notes located on or inside the cabinet and on the chassis.

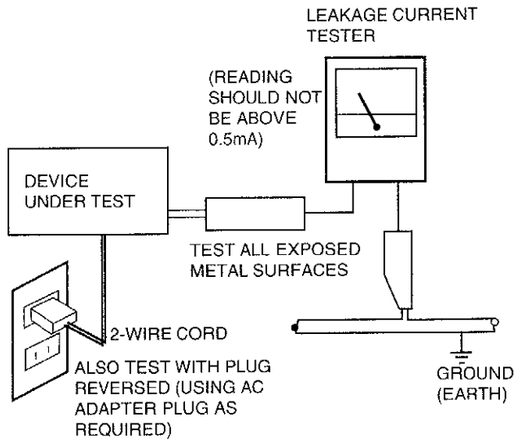
1. When replacing a chassis in the instrument, all the protective devices must be put back in place, such as barriers, non-metallic knobs, adjustment and compartment covers/shields, isolation resistors/capacitors, etc.
2. When service is required, observe the original lead-dress. Extra precautions should be taken to assure correct lead dress in the high voltage circuit.
3. Always use the manufacturers' replacement components. Especially critical components as indicated on the circuit diagram should not be replaced by other manufacturer's. Furthermore, where a short-circuit has occurred, replace those components that indicate evidence of overheating.
4. Before returning an instrument to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the instrument by the manufacturer has become defective or inadvertently defeated during servicing. Therefore, the following checks should be performed for the continued protection of the customer and service technician.

Leakage Current Cold Check

With the AC plug removed from the AC120V, 60Hz source, place a jumper across the two plug prongs. Turn the AC power switch on. Using an insulation tester (DC500V), connect one lead to the jumpered AC plug and touch the other lead to exposed metal parts (antennas, screwheads, metal overlays, control shafts, etc.), particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistor reading of 0.3 Mohm and a maximum resistor reading of 5 Mohm. Any resistor value below or above this range indicates an abnormality which requires corrective action. Exposed metal parts not having a return path to the chassis will indicate an open circuit.

Leakage Current Hot Check

Plug the AC line cord directly into a AC120V, 60Hz outlet (do not use an isolation transformer for this check).
Turn the AC power switch on. Using a "Leakage Current Tester", measure for current from all exposed metal parts of the cabinet (antennas, screwheads, metal overlays, control shafts, etc.), particularly an exposed metal part having a return path to the chassis, to a known ground (earth) (water pipe, conduit, etc.). Any current measured must not exceed 0.5 mA.


LEAKAGE CURRENT TESTER
(READING SHOULD NOT BE ABOVE 0.5mA)
DEVICE UNDER TEST
TEST ALL EXPOSED METAL SURFACES
2-WIRE CORD
ALSO TEST WITH PLUG REVERSED (USING AC ADAPTER PLUG AS REQUIRED)
GROUND (EARTH)

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE UNIT TO THE CUSTOMER.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts have special safety-related characteristics. These are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for a higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual. Electrical components having such features are identified by marking with a ⚠ on the schematics and the parts list in this Service Manual. The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards. Product safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies for, HITACHI Service Manual may be obtained at a nominal charge from HITACHI SALES CORPORATION.

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CHAPTER 1 GENERAL INFORMATION

1. Specifications

Format:	D-VHS/VHS	
Video Signal System:	D-VHS:	D-VHS system standard CTP STD MODE2
	VHS:	NTSC color EIA standard
Record/Playback System:	D-VHS:	Digital: 2 Head record/playback system
	VHS:	Video: 4 Heads
		Audio: VHS Hi-Fi stereo record/playback system
Tape Speed:	D-VHS:	16.67mm/sec(STD)
	VHS:	33.35mm/sec(SP), 16.67mm/sec(LP)(playback only), 11.12mm/sec(EP)
RF Input:	UHF/VHF75 ohm	
Tuner:	USA: 181 channel tuning ability* (125 cable channels)	
	Canada: 178 channel tuning ability* (122 cable channels)	
Type:	Auto programming frequency synthesis	
Power Input:	AC120V 60Hz	
Power Consumption:	26W norminal	
Cabinet Size:	17-1/8″ (W)× 3-7/8″ (H)× 11-1/8″ (D)	
	43.5cm(W)× 9.9cm(H)× 28.2cm(D)	
Weight:	9.2lbs. (4.2kg)	
Storage Temperature:	-4° F to 131° F	
Operating Temperature:	41° F to 104° F	
Accessories:	1 coaxial cable (Part No. 5861682)	
	1 remote control unit (Part No. HL10702)	
	1 digital A/V cable (Part No. EW11381)	
	1 D-VHS video tape (Part No. GU10141)	
	2 AA batteries	

* Check your cable company's compatibility requirements.
For information about how to obtain there and other HITACHI accessories, please call HiTRON, Inc. TOLL FREE at 1-800-995-4500 (in the continental United States). For ALASKA and HAWAII, please contact the nearest Hitachi Regional Office.
Design and specifications subject to change without notice.

2. Comparison with Previous Model

Item	VT-DX815A	VT-UX625A
Video		
Video recording/playback system	D-VHS/VHS	VHS
Y/C separation	Comb filter(CCD)	Comb filter(CCD)
YNR (noise reduction)	No	Yes
CNR (noise reduction)	No	No
Picture quality function	No	No
Color edge clean circuit	No	No
New sync circuit	Yes (PB only)	Yes (PB only)
Picture control	No	No
Jacks		
Video/audio inputs (rear)	1/1	1/1
Video/audio inputs (front)	1/1	1/1
Video/audio outputs (rear)	1/1	1/1
Synchro input (front)	No	No
Prog.		
VCR Plus + programming	No	Yes
Number of timer programs	8 programs/1 year	8 programs/1 year
Auto recording speed	No	No
Remote control		
Model	VT-RM815A	VT-RM625A
Remote jog/shuttle	No/Yes	No/Yes
VCR Plus + code guide channel memory	No	Yes
Miscellaneous		
Frame Advance playback	Yes [Analog]	Yes
Jog/Shuttle dial on the VCR	No/Yes	No/Yes
Cable box control	No	Yes
DSS box control	Yes [For Remote control]	No
Tape navigation	No	No
Closed caption	No	No
Commercial Advance (CA SKIP)	Yes [Analog]	Yes
Movie Advance (MA SKIP)	No	Yes
CEBus Control	Yes	No
Self-diagnosis	Yes (7 modes)	Yes (7 modes)
No. of channels	181	181
Backup time	1 hour	1 hour
Mechanism		
Basic chassis type	US	US
Fast forward/rewind time (with T-120)	about 120 seconds[Full loading]	about 130 seconds[Full loading]
X260 Rewind time (with T-120)	--------	about 83 seconds[Half loading]
Configuration of heads	DA4 heads + Hi-Fi SP video : 2 [48/56µm] EP video : 2 [19/19µm] Audio/Digital: 2 [32/32µm]	DA4 heads + Hi-Fi SP video : 2 [48/56µm] EP video : 2 [19/19µm] Audio : 2 [28/28µm]
Material of heads	SP video : Ferrite EP video : Ferrite Audio/Digital: Amorphous	SP video : Ferrite EP video : Ferrite Audio : Ferrite
Impedance roller	No	No
Head cleaning roller	Yes	Yes
D-VHS detect sw	Yes	No

3. Comparison of Main Control ICs

Function	VT-DX815A	VT-UX625A
Video		
Y/chroma signal processing	HA118204F (IC201)	HA118204F (IC201)
CCD 1H delay	MSM7470-72MS (IC202)	MSM7476-76MS (IC202)
FM audio		
Audio signal processing	AN3962FB (IC501)	AN3962FB (IC501)
Level meter control	----------	----------
Preamp		
Video head switch	HA118198F (IC1101)	HA118198F (IC1101)
Audio pre/rec amp	HA118189 (IC3101)	LA7256 (IC1102)
DIGITAL		
Digital Signal Process	HTS7431 (IC3201)	----------
CEBus µP	SC430931 (IC3208)	----------
A/D Converter	uPC659AGS (IC3452)	----------
PLL Process	uPC5022GB-117-2A5 (IC3501)	----------
Digital Env. detect	BA7048N (IC3551)	----------
Digital input / output	DS36C200MX (IC3601)	----------
MTS/OSD		
MTS decoder	HTS7337 (IC1801)	HTS7342 (IC1801)
OSD control/Sync separator/AFC	Included in Main µP	Included in Main µP
Servo		
Servo control	Included in Main µP	Included in Main µP
FG/tach amp	Included in Main µP	Included in Main µP
System control		
Main µP (system control µP)	HD6473977F-815 (IC901)	HD6433977SB62F (IC901)
VCR-EEPROM	ST24C02-6 (IC903)	ST24C02-6 (IC903)
Loading motor drive	XLA6209-V3 (IC904)	BA6209 (IC904)
Shuttle code	----------	----------
Timer		
Timer µP	Included in Main µP	Included in Main µP
Display driver	BU9716AK (IC1701)	BU9716AK (IC1701)
Expander	----------	----------
Auto clock setting	----------	LC7455A (IC2901)
Commercial Advance		
Commercial Advance(CA-µP)	----------	CXP80712A122Q (IC4501)
Reset	----------	PST9145T (IC4502)
Sync separator	----------	MM1108XF (IC4506)
Commercial Advance EEPROM	----------	----------
Power supply		
Switching driver	----------	STR-F6510 (IC851)
A9V regulator	----------	----------
5V regulator	M5278L05 (IC905)	M5278L05 (IC905)

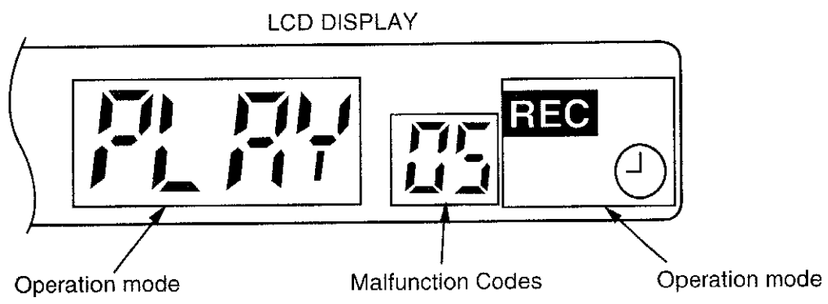
4. Tips for Servicing

4-1. Trouble Display Function

This VCR has a function which displays mechanism malfunctions, etc. in the LCD display. Use this function to analyze the cause when the power is shut off due to a malfunction, etc. in the mechanism.
Two types of information are displayed, (1) The operation mode when the malfunction has occurred, (2) Malfunction Codes.
The details of the malfunction are displayed as follows:

Procedure to display a malfunction

Press the "CHANNEL DOWN" button on the VCR when the power is turned off and hold it; the malfunction code is displayed while the button is held depressed.



[Display of Details of Malfunction]

Displayed No.	Item	Details
00	No malfunction	
01	FL mechanism lock	Malfunction in insertion/ejection of cassette
02	Capstan lock	Malfunction of capstan motor drive during tape unloading
04	Reel lock	Reel rotation trouble when tape is running
05	Cylinder lock	Cylinder rotation malfunction
07	Loading mechanism lock	Malfunction in shifting mechanism mode
16	Servo lock	Shorting of 5V detected

[Mode Display when Malfunction Has Occurred]

Mode	Display
Stop	No display
Fast forward	**FF**
Rewind	**REW**
Recording	**REC**
Timer recording	◷ **REC**
Recording pause	**REC** (flashes)

Mode	Display
Playback	**PLAY**
Forward search	**SRCH**
Reverse search	**-SRCH**
Slow	**SLOW**
Still play	**STILL**
Reverse slow	**-SLOW**

No symbols are displayed if the malfunction occurred when a cassette was inserted or ejected, or the power was switched on from off, and off from on.

4-2. How to Remove the Cassette when a Malfunction Has Occurred in the Mechanism

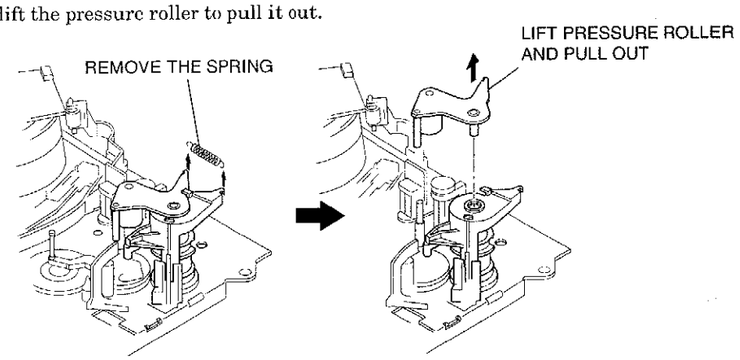
If a cassette is caught in the mechanism because of a malfunction in the mechanism, remove it by the following procedure.

[Work Procedure]
1. Remove the top cover.
2. Remove the front panel.

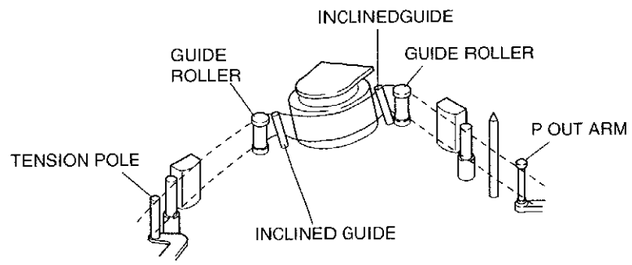
If the tape is wound round the cylinder in the loading state

If the cassette does not come out from the FL mechanism in the unloading state.

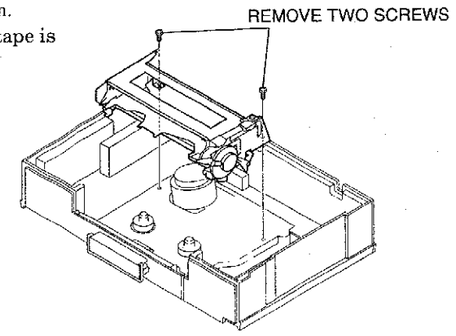
Remove the spring and lift the pressure roller to pull it out.



Slacken the tape and release it from the tension pole, guide rollers, inclined guides and P out arm.

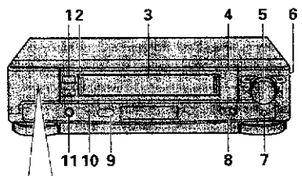


1)Remove two screws holding the FL mechanism.
2)Hold the cassette lid with your fingers so the tape is not damaged and remove the FL mechanism.
3)Remove the slack tape and eject the cassette.

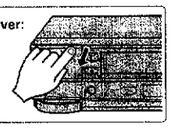


CUSTOMER CONTROLS

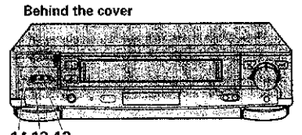
VCR Customer Controls

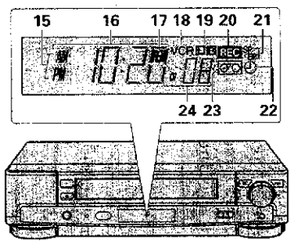


To open the cover:
Pull the cover forward with your fingers.



Behind the cover





Item No.	Function	Page
1	POWER button	2
2	EJECT button	9
3	Cassette compartment	9
4	STOP button	25
5	Shuttle ring	31
6	PLAY/STILL button	29
7	REC/IRT button	36
8	CHANNEL (channel up/down)/ TRACKING buttons	36 28
9	Infrared receiver	8
10	REC indicator	36
11	D-VHS indicator	27
12	AUDIO IN (L),(R) jacks	50
13	VIDEO IN jack	50
14	ANT. OUT select button	10
	VCR Display	
15	AM/PM indicators	22
16	Time,	22
	Time counter,	33
	Tape remaining or	33
	VCR mode indicator	27
	PLAY — playback	27
	SRCH — double-speed play and visual search ("–" appears during reverse direction viewing)	29
	SLOW — slow play	—
	REW — rewind	27
	FF — fast forward	—
	STILL — play pause and frame advance	29
17	REM (tape remaining time) indicator	33
18	VCR, operate mode	—
19	Audio indicators	—
20	REC — record (flashes during record pause)	36
21	Tape speed SP/EP	35
22	Delayed recording indicator	45
23	Tape-in indicator	9
24	TV channel,	36
	Auxiliary (L1/L2)	51
	DSS indicator (dSS)	27
	Tracking Level Meter	28

Accessories supplied

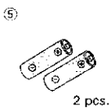
Check and identify the accessories supplied.
If any are missing or appear damaged, consult your dealer.

Remote control

Cable for connecting this VCR to a TV

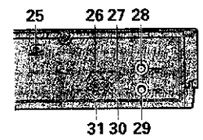
Digital A/V cable

D-VHS video cassette


2 pcs.
Batteries for remote control handset (R6)

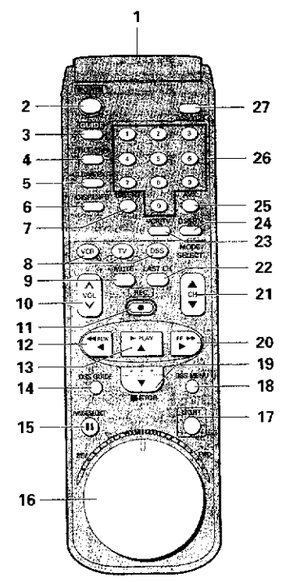
CUSTOMER CONTROLS

VCR Customer Controls



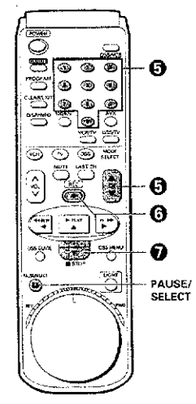
Item No.	Function	Page
25	DIGITAL A/V jack	10
26	AUDIO IN (L), (R) jacks	49
27	VIDEO IN jack	—
28	IN FROM ANT. — signal input	10
29	OUT TO TV — signal out to TV	10
30	VIDEO OUT jack	11
31	AUDIO OUT (L), (R) jacks	11

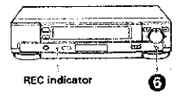
Remote Control Customer Controls



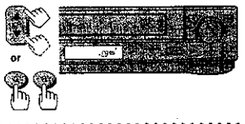
Item No.	Function	Page
1	Transmission window	8
2	POWER button	24
3	GUIDE — to recall OSD menu	24
4	PROGRAM (programming) button	44
5	CLEAR/EXIT — clears time counter	34
6	DISP/INFO — to recall on-screen display	33
7	100/ENT button	36
8	VCR, TV, DSS — device buttons let you set the remote to control one of the three devices	8
9	MUTE button — turns off the audio until you press MUTE again	47
10	VOL button — increase or decrease the audio volume	47
11	REC — record button	36
12	REW button — fast rewind or search	27
13	PLAY button — playback	27
14	DSS GUIDE button	48
15	PAUSE/SELECT button	29
16	Shuttle ring	31
17	LIGHT button — illuminates key function buttons for a few seconds	8
18	DSS MENU button	48
19	STOP button — stops play/record function	27
20	F.F button — fast forward or search	29
21	CH (channel up/down) button	39
22	LAST CH button — switches to the TV channel you watched previously during the current viewing session.	47
23	VCR/TV mode select button	40
24	DSS/TV mode select button	48
25	AVX button — select L1 or L2	49
26	Number buttons	22
27	DSS/VCR button	36

VHS RECORDING STEP

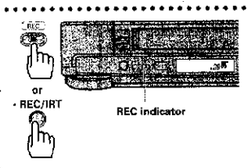




5 Press the CH (▲/▼) button or the number buttons to select the channel you want to record.
Example: Select channel 8.
- 100/ENT and ② and ④ for channel 124.

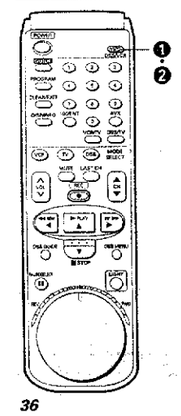


6 Press the REC button on the remote control or the REC/IRT button on the VCR.
Recording will start and the REC indicator on the VCR will light red.
Notes:
- *Recording will not start unless the cassette has the safety tab in place. If this tab has been removed, the VCR will eject the tape.*
- *Press the PAUSE/SELECT button to set the VCR to the recording pause mode. Press the button again to re-start recording.*
- *If you stay in PAUSE mode for more than 5 minutes, the VCR automatically switches to STOP mode to protect the tape.*



7 Press the STOP button to finish recording.

■ To watch a DSS* program while recording a program other than DSS*



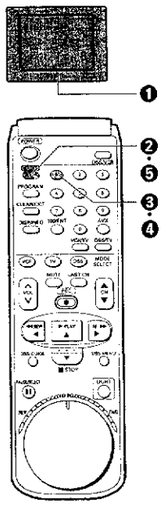
1 Press the DSS/VCR button on the remote control so that a DSS* program appears on the TV screen.

2 Use the DSS* box to select the DSS* channel you want to view.
- To view the program being recorded, press the DSS/VCR button on the remote control again.

D-VHS RECORDING SETUP

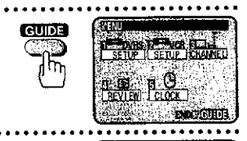
■ Setup Procedure (Hookups A, B or C)

Perform the following procedure before D-VHS recording DSS* programs:

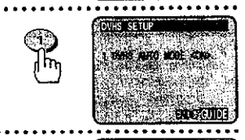


1 Turn on the TV and select the video channel (3 or 4).
Or, if you are hooked up with an audio/video cable, set the TV to AUX or VIDEO.

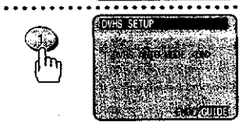
2 Press the GUIDE button.
The main on-screen menu will appear on the TV screen.



3 Press the ① button to select the D-VHS SETUP operation.



4 Press the ① button to select D-VHS AUTO MODE <ON> or <OFF>.



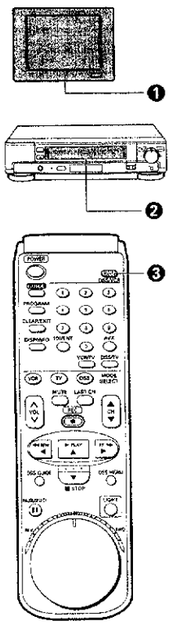
<ON>: When recording DSS* programs on D-VHS tape in the D-VHS format. Normally, select <ON>.
Notes:
- *When the VHS tape is inserted, DSS* programs will be recorded in the VHS format.*
- *Any section guarded against copying (where a copy protect signal is inserted) will be recorded in the VHS format.*
- *If the digital A/V cable is not connected, DSS* programs will be recorded in the VHS format.*

<OFF>: When VHS or D-VHS tape is inserted, DSS* programs will be recorded in the VHS format.

5 Press GUIDE to end the setting.

D-VHS RECORDING STEP

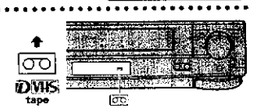
■ Basic recording steps



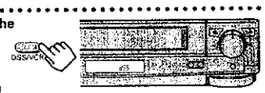
Notes:
- *A D-VHS tape should be used for D-VHS recording.*
- *The VCR and DSS® box must be connected via a digital A/V cable.*
- *You may use a blank tape or you may record over a previously recorded (erasable) tape.*
- *D-VHS recording will automatically be done in the STD mode. The recording speed will not appear in the VCR's display.*
- *Recording may not be possible immediately after the digital A/V cable has been unplugged or plugged in. Wait for at least 15 seconds and then start recording.*

❶ Turn on TV and select the video channel (3 or 4).
Or, if you are hooked up with an audio/video cable, set the TV to AUX or VIDEO.

❷ Insert a blank or erasable tape with the D-VHS mark.
The power comes on automatically and the tape indicator lights on the display.
- If a cassette without its safety tab is inserted, playback starts automatically, and you cannot complete the record operation.

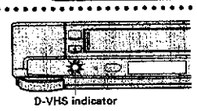


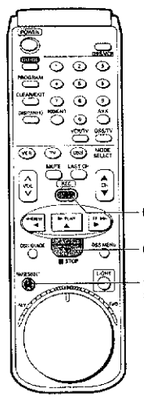
❸ Press the DSS/VCR button on the remote control so that a DSS® program appears on the TV screen.
- The dSS indicator will light in the VCR's display.



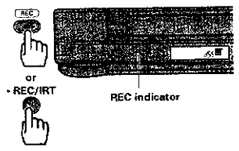
❹ Use the DSS® box to select the DSS® channel you want to record.
- The DSS® program will appear.

❺ Make sure the D-VHS indicator lights.





❻ Press the REC button on the remote control or the REC/IRT button on the VCR.
Recording will start and the REC indicator on the VCR will light red.

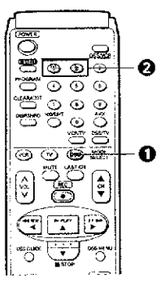


Notes:
- *Recording will not start unless the cassette has the safety tab in place. If this tab has been removed, the VCR will eject the tape.*
- *Press the PAUSE/SELECT button to set the VCR to the recording pause mode. Press the button again to re-start recording.*
- *If you stay in PAUSE mode for more than 5 minutes, the VCR automatically switches to STOP mode to protect the tape.*
- *If the digital A/V cable comes unplugged during D-VHS recording, recording will stop.*
- *Any section guarded against copying (when a copy protect signal is inserted) will be recorded in the VHS format.*

❼ Press the STOP button to finish recording.

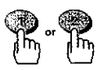
USING THE VCR REMOTE TO OPERATE HITACHI OR HUGHES DSS® BOX

The VCR remote control can be programmed to control Hitachi or Hughes. When using a DSS® box other than these two brands, refer to the DSS® box manual.



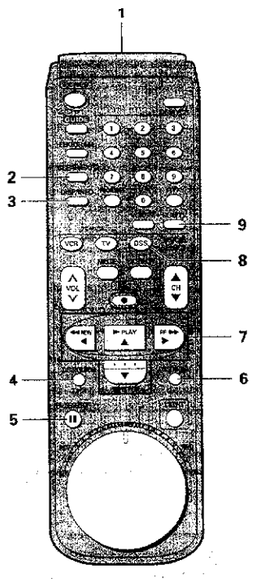
❶ Press and hold the "DSS" button.

❷ Press ① or ② button corrsponding to your DSS® box receiver ID number as shown in the chart below.



DSS® box Brand	DSS® box receiver ID number	Press "DSS" and this button
Hitachi	DSS 1	1
	DSS 2	2
Hughes	DSS 1	2
	DSS 2	1

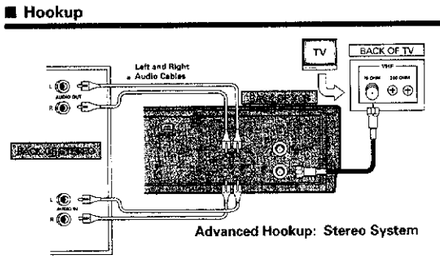
Remote Control Customer Controls



1	—	Transmission window
2	CLEAR/EXIT	to clear the main menu from the display and will return to the channel that was being viewed prior to entering the menus.
3	DISP/INFO	to show the information about the program on the TV screen.
4	DSS GUIDE	to show the available program at a given time on several different channels.
5	PAUSE/SELECT	to show the program guide on the TV screen while watching DSS video.
6	DSS MENU	to show the main menu on the TV screen.
7	—	Cursor keys for DSS® box.
8	DSS	to select DSS to control from three devices (VCR, TV, DSS).
9	DSS/TV	to select the DSS mode or the TV mode.

INTEGRATING YOUR STEREO SYSTEM WITH YOUR VCR

■ Hookup

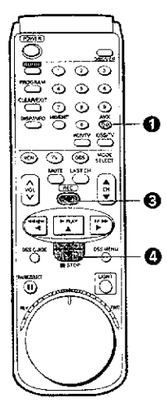


* PURCHASED SEPARATELY

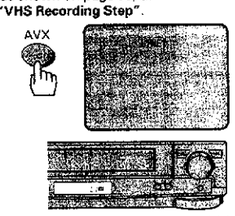
When your VCR is connected to a stereo system, you can:
- Make high quality "audio only" recordings for up to 6 hours (on a T-120 video cassette tape).
- Receive quality stereo sound from your VCR through your stereo system.
- Use the VCR as an extra audio tape deck for dubbing.

■ To record from stereo

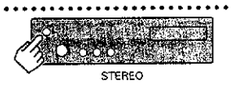
BEFORE YOU BEGIN...
- Make sure the VCR is connected to your stereo system, as shown above.
- Make sure that **"STEREO"** audio is selected from the VCR Set-Up Menu, as shown on **Page 41**, of **"RECORDING OPERATION"** Section, **"Stereo vs. mono sound"**.
- Select VCR recording speed (**SP** or **EP**) as shown on **page 35**, of **"RECORDING OPERATIONS"** Section, **"VHS Recording Step"**.



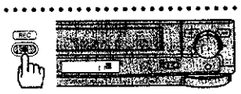
❶ Press the AVX button on remote control, so that L1 (line) appears on the display.



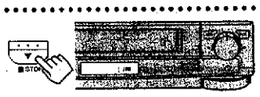
❷ Turn on stereo, and start the selection you wish to record.



❸ Press the REC/IRT button on VCR or REC button on the remote control to start recording.



❹ Press the STOP button to stop recording.



CHAPTER 2 DISASSEMBLY

1. Before Starting Disassembly

1) Unplug the power cord from the AC outlet.
2) [Removal procedure]
   If a special procedure is required when dismantling any component, it is indicated using numbers. Follow the numbers (1),(2),(3) ...) shown in the illustrations.
   [Reinstallation procedure]
   Reinstall each component in the reverse order to removal when otherwise not specified.
3) Insert card connectors securely all the way as they are of the direct insertion type.

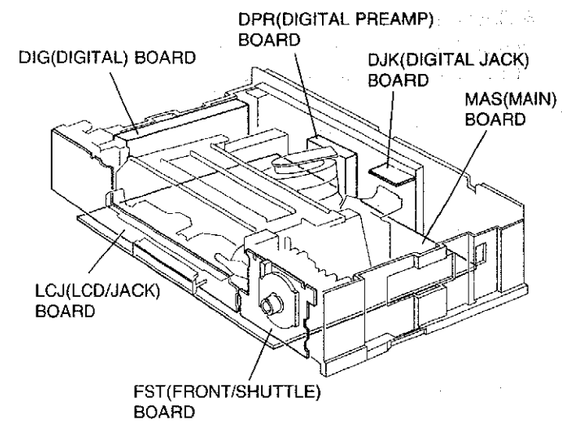


Fig. 1-1

2.Disassembly Method

When replacing defective parts, first refer to the "Parts hierarchy chart" shown below.
This chart shows the procedure for parts removal when replacing defective parts.

[How to use the parts hierarchy chart]
(1) Locate the part to be replaced.
(2) Check the parts in the ranks above the part to be replaced and start dismantling.
(3) Replace the defective part and reinstall the parts in the reverse order to that shown in the parts hierarchy chart.

Parts Hierarchy Chart

Note: Dismantle parts in the eject state.

Parts to remove	Item	Parts to remove	Item
Top cover	2-1	DJK board	2-3
		DIG board	2-4
Front panel	2-1	Cassette door	2-2
		Insulator	2-2
Rear panel	2-1	DPR board	2-6
US-FL mechanism	2-1		
Front piece	2-3	LCJ board	2-5
		FST board	2-5
US mechanism/ MAS board assembly	2-7	US mechanism	2-8

PROBLEM GUIDE

Problem guide

No power	• Make sure the VCR is plugged into an AC outlet.
Remote control doesn't work	• Make sure the batteries are fresh, and properly installed.
Won't record	• Safety tab has been removed from cassette (VCR will automatically eject the tape).
Won't play back	• Make sure the TV/VCR switch is set to the VCR mode. • Make sure the TV is set to the VCR channel (3 or 4) or AUX (if using direct audio/video hookup).
Won't make timer recordings	• The VCR power must be turned off to activate timer recording. • Clock is not set correctly. • Programs entered incorrectly. • Programs exceed the length of the cassette. Use the EP recording speed for maximum programming. • Safety tab has been removed from cassette.
Snowy picture in playback	• Snow or picture noise is normal during search, still, and slow Playback. • Head cleaning may be required. • Tape is worn or of inferior quality - adjust tracking controls.
Snowy picture in normal TV viewing	• Check antenna or cable connections.
Clock shows - - : - -	• Power has been interrupted - reset the clock. • Reset the clock.
Erratic VCR display	• Push the reset switch (behind the cover on the VCR front) with a sharp pointed instrument (pen, toothpick, etc.).
A DSS® broadcast programmed for delayed recording, but not recorded.	• Turn off the VCR before the delayed recording starts. • Use the DSS® box to select a DSS® program.
Cannot D-VHS playback/record.	• Make sure the VCR and DSS® box are connected via a digital A/V cable.
Still picture with block noise appears during D-VHS playback.	• Clean the heads. • You have played tapes other than D-VHS and VHS. • Tracking is off. Correct it.

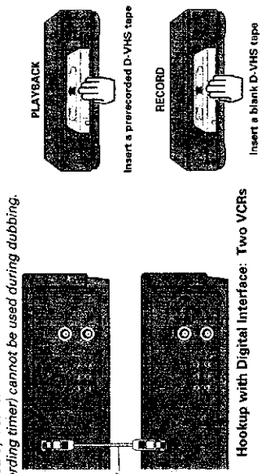
COPYING FROM ONE VT-DX815A TO ANOTHER VT-DX815A (DUBBING)

Hookup

If you have two VT-DX815As, you may use one VT-DX815A to record a tape that is being played back in the other VT-DX815A.

Notes:

- *Analog recorded sections cannot be dubbed. See page 51 if you want to dub analog recorded section.*
- *You cannot dub a section guarded against copying (where a copy protect signal is inserted) on tape. When the copy guarded section is played back by VCR-2, the D-VHS indicator will flash, and no picture or sound will be recorded by VCR-1.*
- *The iRT (instant recording timer) cannot be used during dubbing.*



To copy from one VT-DX815A to another VT-DX815A

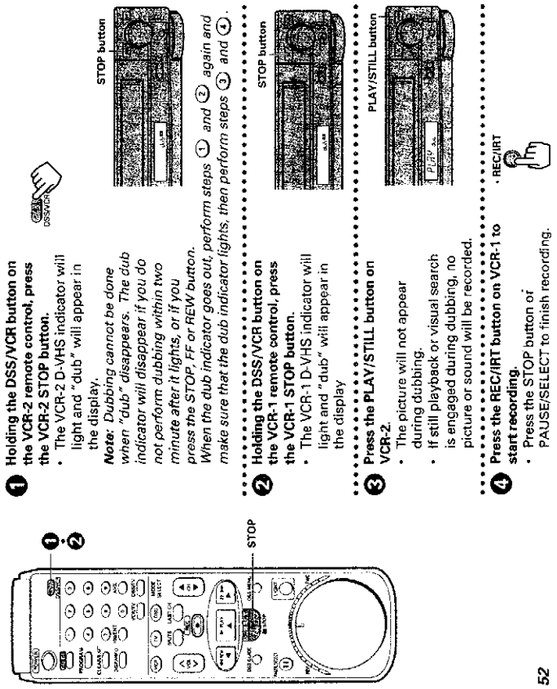
❶ Holding the DSS/VCR button on the VCR-2 remote control, press the VCR-2 STOP button.
- The VCR-2 D-VHS indicator will light and "dub" will appear in the display.

Note: *Dubbing cannot be done when "dub" disappears. The dub indicator will disappear if you do not perform dubbing within two minute after it lights, or if you press the STOP, FF or REW button. When the dub indicator goes out, perform steps ❶ and ❷ again and make sure that the dub indicator lights, then perform steps ❸ and ❹.*

❷ Holding the DSS/VCR button on the VCR-1 remote control, press the VCR-1 STOP button.
- The VCR-1 D-VHS indicator will light and "dub" will appear in the display

❸ Press the PLAY/STILL button on VCR-2.
- The picture will not appear during dubbing.
- If still playback or visual search is engaged during dubbing, no picture or sound will be recorded.

❹ Press the REC/iRT button on VCR-1 to start recording.
- Press the STOP button or PAUSE/SELECT to finish recording.



Disassembly Procedure Diagrams

Item	Parts to remove
2-1	Top cover, front panel, rear panel and US-FL mechanism

◆ Caution when reinstalling the US-FL mechanism

Reinstall the US-FL mechanism in the state that the cassette holder is pulled forward.
(Otherwise, the switch arm could damage the FL switch on the MAS board.)

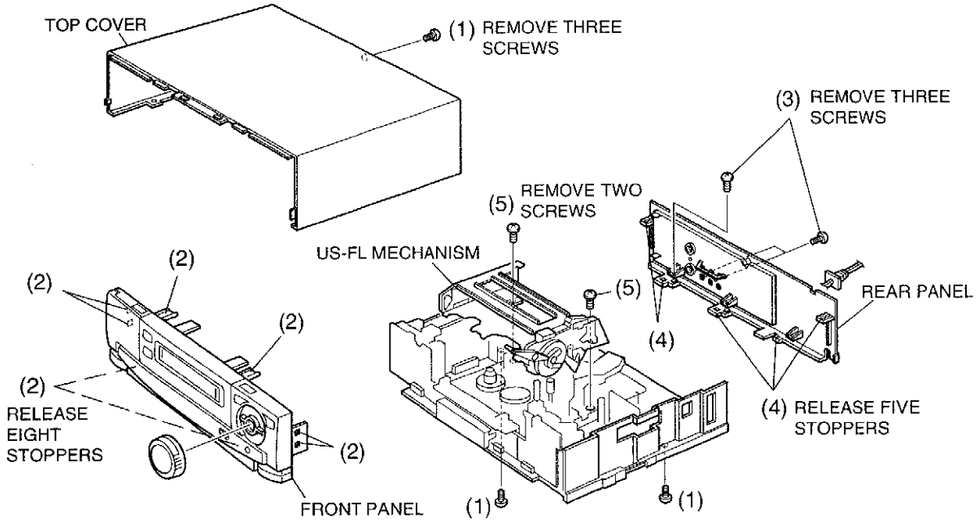


Fig. 2-1

2-2	Cassette door and insulator

◆ Caution when reinstalling the front panel

Reinstall the front panel in the state that the cassette door is pushed so the boss of the door arm comes to the front of the boss support of the cassette door.

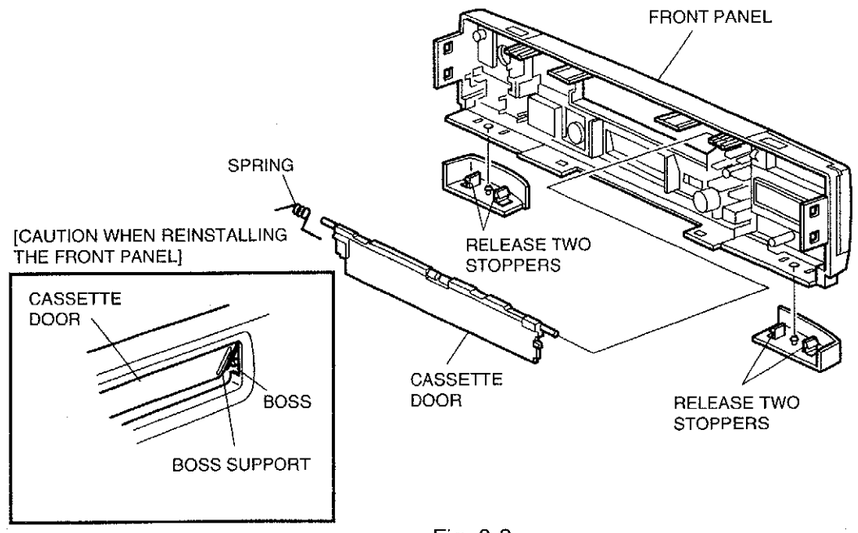


Fig. 2-2

2-3	DJK board

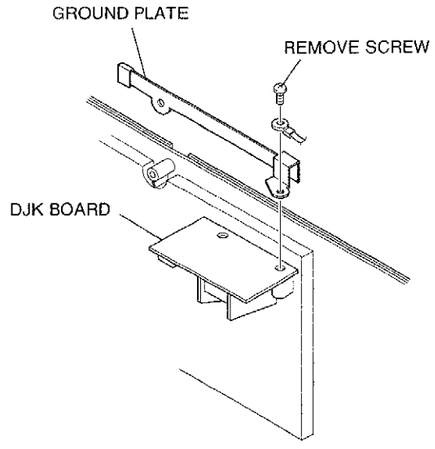


Fig. 2-3

2-4	DIG board

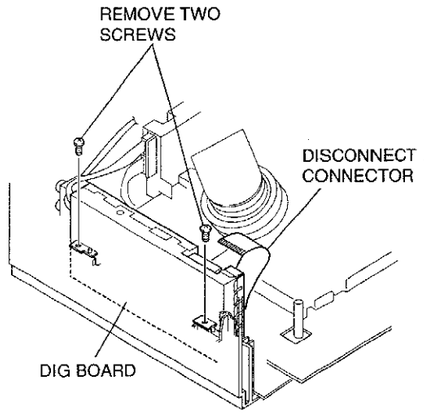


Fig. 2-4

Item	Parts to remove
2-5	Front piece, LCJ and FST boards

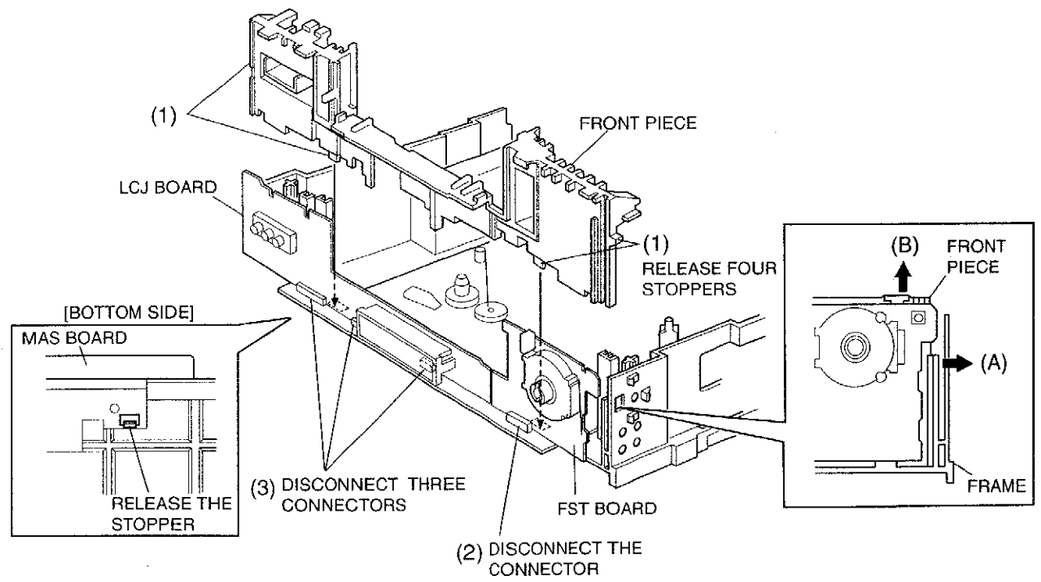


Fig. 2-5

2-6 DPR board

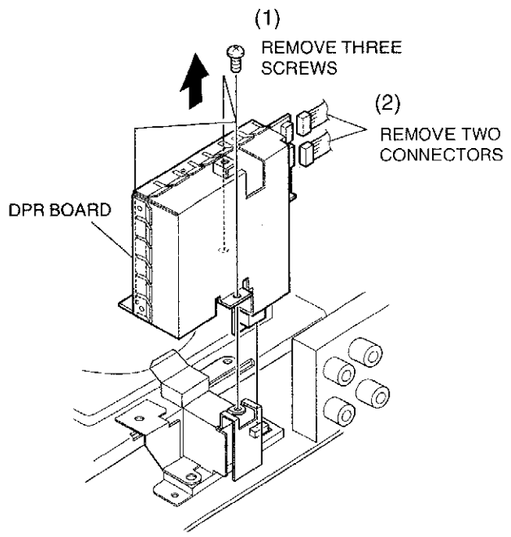


Fig. 2-6

2-7 US mechanism/MAS board assembly

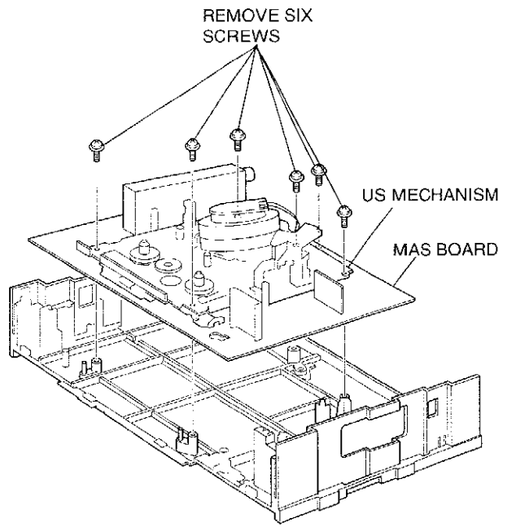


Fig. 2-7

Item	Parts to remove
2-8	Separation of MAS board from US mechanism

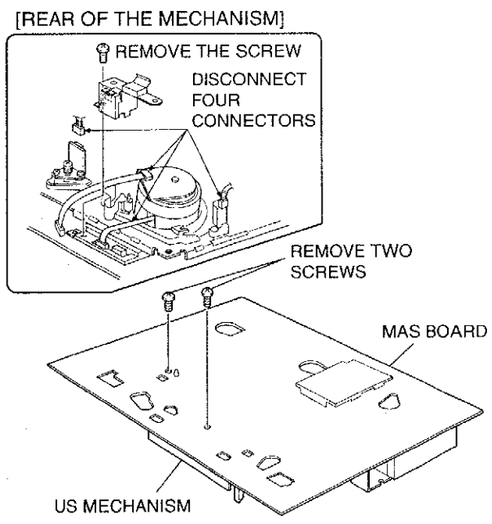


Fig. 2-8

Procedure to remove only the US mechanism

With this VCR the US mechanism can be removed without removing the MAS board. This is done by a different method from the normal disassembly method.

Parts to remove	Item
Top, Front and Rear panels	2-1
⇩	
DPR board	2-6
⇩	
US-FL mechanism	2-1
⇩	
Remove two screws on the bottom of the VCR.	2-9
⇩	
Remove five screws holding the US mechanism.	2-9
⇩	
Disconnect the connectors on the US mechanism and lift the mechanism.	

2-9 Procedure to remove only the US mechanism

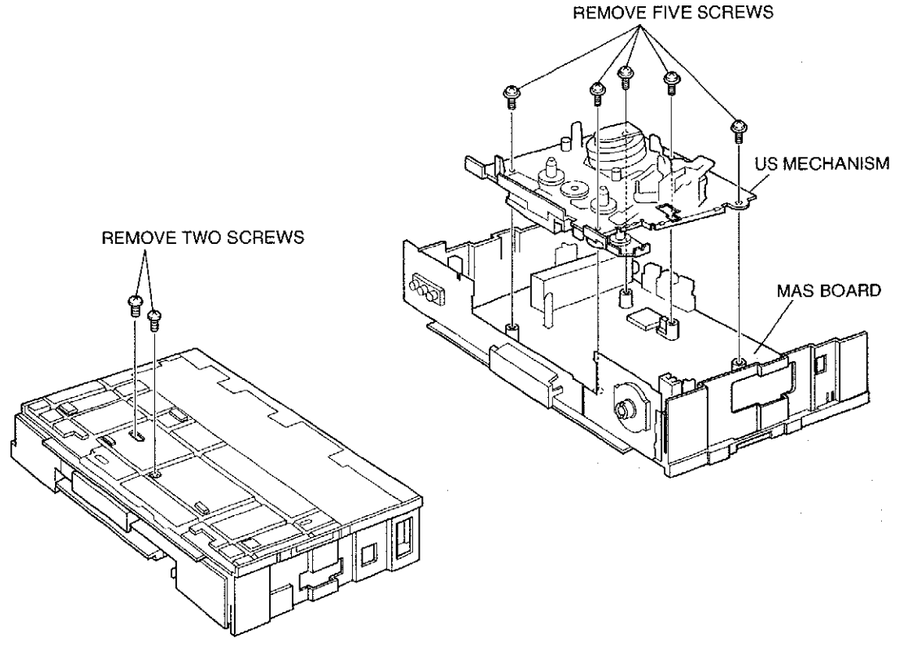


Fig. 2-9

3. Cautions When Reinstalling the US Mechanism

This VCR has mechanism sensors on the MAS board and the capstan and loading motors are connected via direct connectors. Therefore, when reinstalling the US mechanism, observe the following cautions.

1) Align the ▽ mark and mode no. 1 of the mechanism state switch on the MAS board. (Mode no. 1 of the mechanism state switch has a click position.)

2) Check that mode no. 1 on the P drive gear in the mechanism and the ▽ mark of the spring hook are aligned. If they are not aligned, turn the loading motor pulley to align them.

3) Pass the end LED through the hole in the mechanism and install the mechanism from immediately above using the installation position holes as reference. Check that the boss of the mechanism state switch and the hole in the cam gear are aligned.

4) Push the terminal sections (shaded sections ▨) of the capstan and loading motors and check that they are inserted securely.

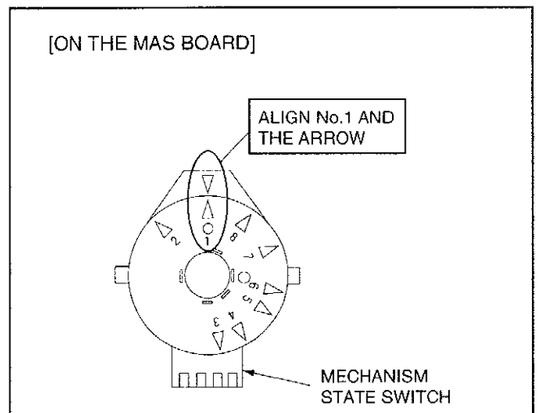


Fig. 3-1

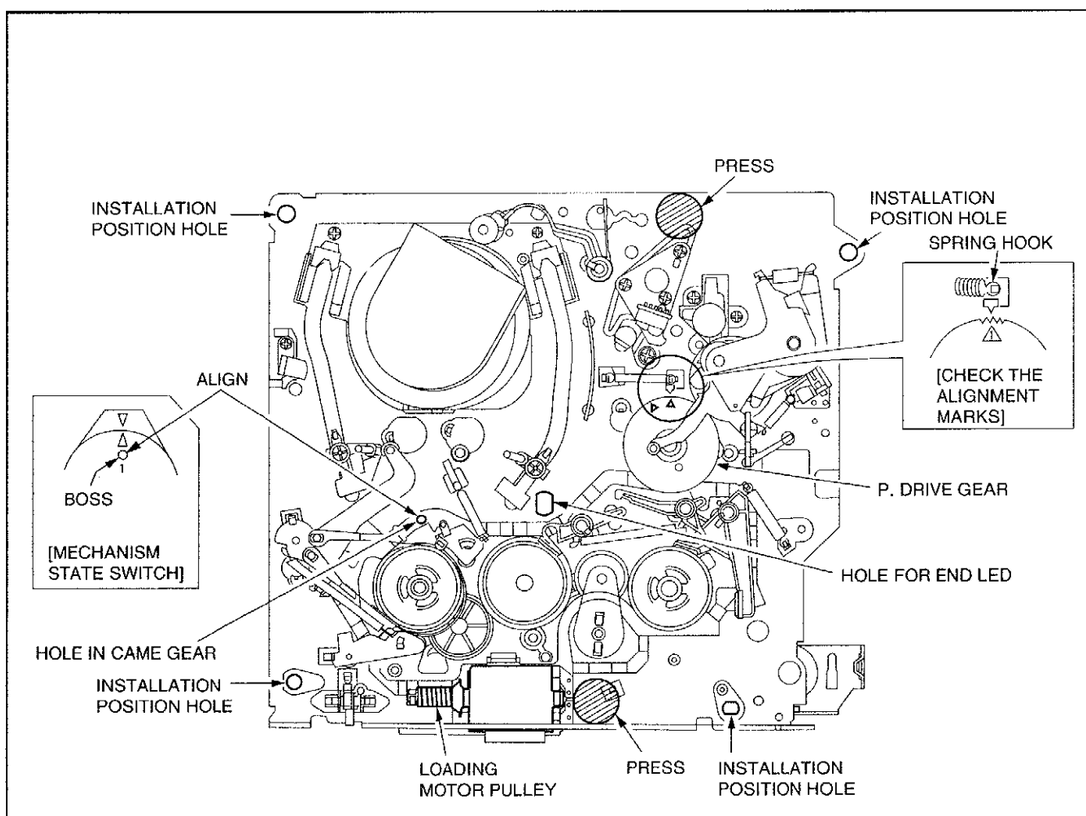


Fig. 3-2

4. Differences between the VT-DX815A's US Mechanism and Previous US Mechanism

There are some differences between the US mechanism used in the VT-DX815A and previous US mechanism. This section includes only those items that differ from the US MECHANISM service manual (No. 4527E).

1. Addition of D-VHS switch

The VT-DX815A has a D-VHS switch which detects a D-VHS tape; it is the same as the conventional S-VHS switch.

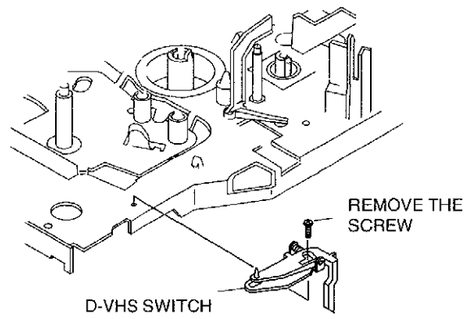


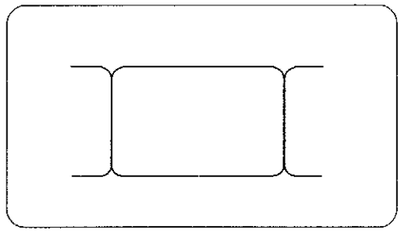
Fig. 4-1

2. Change in specifications when checking the FM envelope flatness

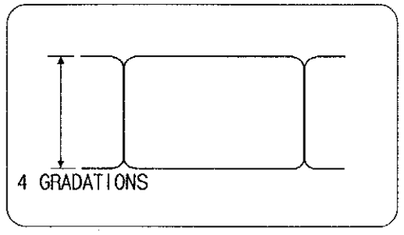
The amplitude of FM envelope when its flatness is checked has been partially changed; the change shown in the shaded section.

Checking the flatness and fluctuations of FM output/waveform diagrams

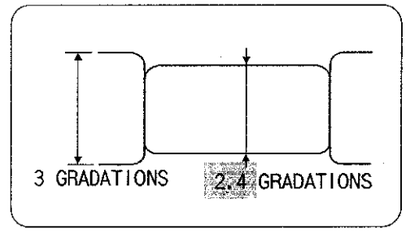
1) Activate autotracking.



2) Finely adjust the voltage level range of the osilloscope so the FM output is set to 4 graduations.



3) Adjust the tracking so the maximum amplitude of the FM ouotput is set to 3 graduations.
4) Check that the minimum amplitude is more than 2.4 graduations at this time.



5) Check that the difference between the maximum and minimum level fluctuations is less than 13%.

MEMO

CHAPTER 3 ELECTRIC CIRCUIT ADJUSTMENT

Service Position

1. Servicing position during electrical adjustment

Perform adjustment after removing the top cover, front panel and rear panel.

When the shield cover of the connector between the cylinder motor and MAS boards is removed, noise appears in the playback picture. Attach the shield cover when checking the picture on the screen.

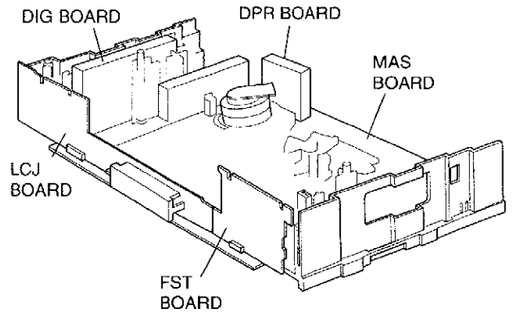


Fig. 1

2. Servicing positions when repairing and checking circuits

2-1. Procedure to set the LCJ and FST boards to the servicing positions (Fig. 2)

1) Remove the top cover and front panel.
2) Remove the DJK board.
3) Remove the rear panel.
4) Remove the US-FL mechanism.
5) Remove the front piece.
6) Open each board as shown in the figure below and perform checks from the pattern sides indicated by the arrows.

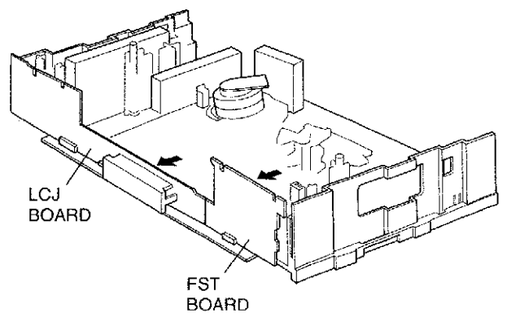


Fig. 2

2-2. Procedure to set the MAS board to the servicing position (Fig. 3)

1) Remove the top cover and front panel.
2) Remove the DJK and DIG boards.
3) Remove the rear panel.
4) Remove the US-FL mechanism and front piece.
5) Remove the MAS board, with the LCJ and FST boards and US mechanism assembled from the frame.
6) Turn over the MAS board and perform checks from the pattern side indicated by the arrow.

Note the following two points at this time:

1) Lay an insulation sheet under the boards.
2) Attach the shield cover at the rear of the cylinder. Attach the US-FL mechanism when loading the tape.

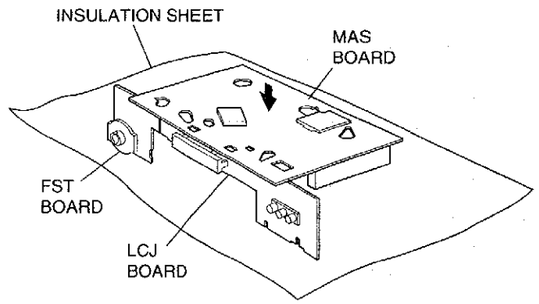


Fig. 3

3. Be careful of electric shocks

The power supply block on the right of the VCR has a heat sink which generates a high voltage. "HIGH VOLTAGE" is printed on the heat sink.
Take great care when handling this heat sink when the power is turned on during servicing.

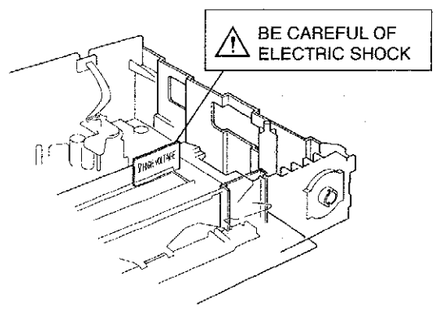


Fig. 4

Electrical Circuit Adjustment

1. Test equipment/jigs necessary for adjustment

1) Dual-trace oscilloscope
2) Color bar generator
3) Voltmeter
4) Frequency counter
5) Monitor TV (with A/V jacks)
6) Alignment tapes:
   NTSC tape : Part No. 7099046
   30HMP2-1 : Part No. 7099089
   24HMAF-2 : Part No. 7099153
   (Hi-Fi alignment tape)
   NTSC-CTP2 (D-VHS alignment tape)
7) Blank tapes (VHS/D-VHS or S-VHS)
8) C/R oscillator

2. Cautions on adjustment

1) The following conditions apply when otherwise not specified:
   Probe of oscilloscope: 10:1
   Synchronization of oscilloscope: Internal sync
   Ground of test equipment: PG2508 pin 6
   (on MAS board)
2) When performing more than one adjustment, follow the specified order.

3. Tips for adjustment

3-1. Procedure to reset the main microprocessor

The main microprocessor is not reset even when the power cord is unplugged from the AC outlet because its power is backed up by a backup circuit. Press S1719 on the LCJ board to reset all the microprocessors.
Do not press the reset switch with the power cord unplugged from the AC outlet as the slow tracking preset value could drift. If the preset value drifts, plug the power cord into an AC outlet and press the reset switch again with the power turned on. It is recommended that you press the reset switch after reinstalling the front panel.

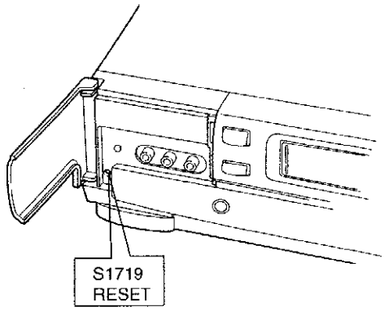


Fig. 5

3-2. Procedure to switch off the blue background function

1) Press the "GUIDE" button of the remote control to display the menu on the monitor TV screen.
2) Press "2" to select the VCR setup screen.
3) Press "1" to specify blue background off.

3-3. Procedure to obtain the EP head playback mode (X-value adjustment test mode)

Press the "1" and "4" buttons of the remote control provided simultaneously when an alignment tape is being played and hold them, then press the "CHANNEL ▽" button on the VCR; The VCR enters the EP head playback mode (X-value adjustment test mode).
Check that "**TEST**" appears in the LCD display.

4. Connections of test equipment

Connect the test equipment as follows when otherwise not specified:

1) Connect a color bar generator to the video input 1 jack of the VCR.
2) Connect a monitor TV to the video output jack of the VCR.
3) Connect a monitor TV (able to handle a stereo signal) to the audio output jack.
4) Connect an antenna to the antenna jack and receive a TV broadcast (only for sound multiplex adjustment).

Caution when setting to the test mode

The remote control provided with VT-DX815A does not have a function that sets tracking to the center. Using a remote control of another model VCR, simultaneously press the "1" and "4" buttons of the remote control, so that tracking is set to the center and the test mode is set.
This manual explains that the command to set tracking to the center and set the VCR to the test mode is issued when "1" and "4" buttons of the remote control are pressed simultaneously. However, the command is different for each model, so be sure to check the service manual of the remote control being used.

5. Test Points and Adjustment Points

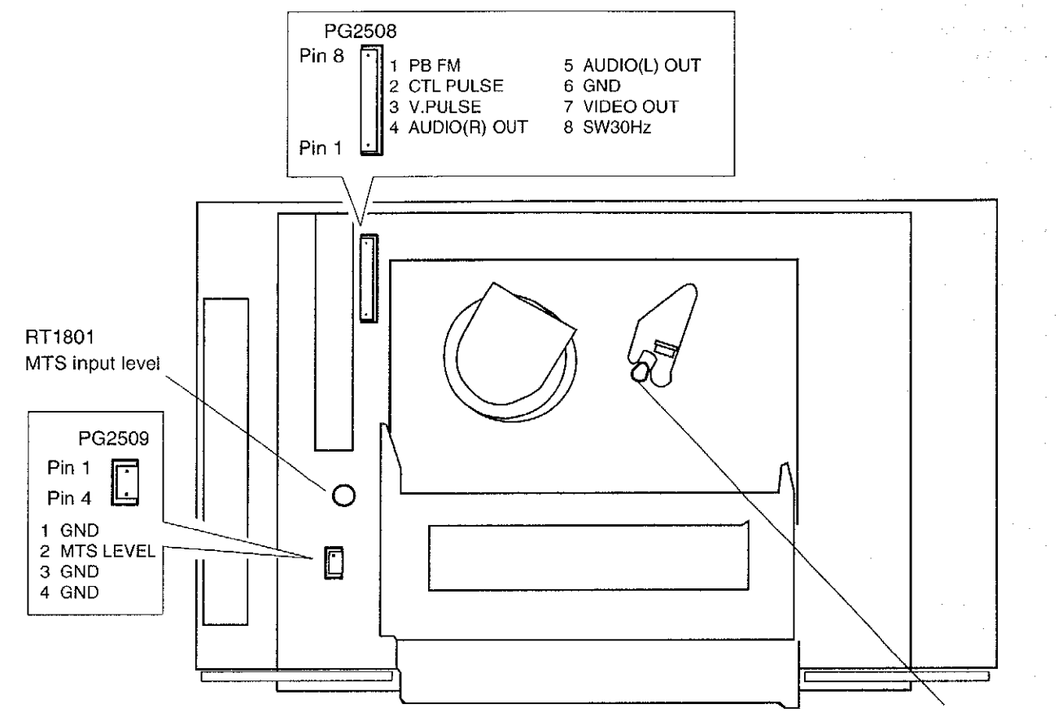


Fig. 6 MAS (Main) Circuit Board [Components Side]

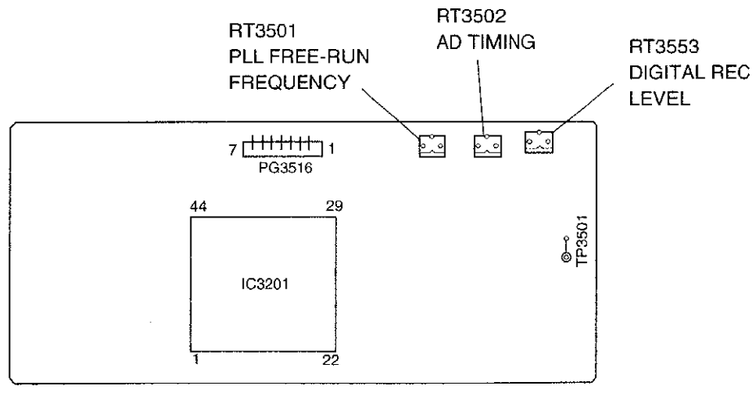


Fig. 7 DIG (Digital) Circuit Board [Components Side]

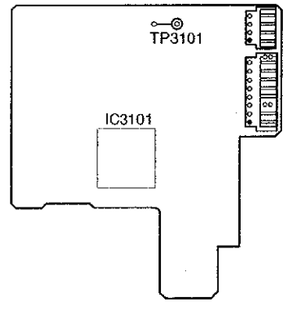


Fig. 8 DPR (Digital Preamp) Circuit Board [Components Side]

6. Servo Circuit Adjustments

6-1. Switching point adjustment (Fig. 7)

Purpose:
To set the switching point of the video heads during playback to the center where the CH-1 and CH-2 envelopes overlap each other.

Fault due to incomplete adjustment:
Switching noise appears across the bottom of the screen.

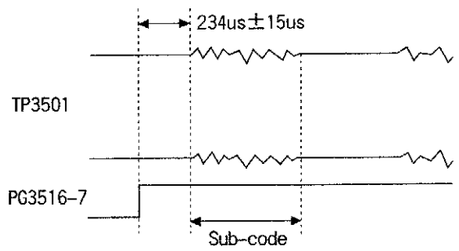
Test Equipment/Jigs and Connection Points
Oscilloscope CH-1: TP3501 (PB OUT)
CH-2: PG3516-7 (SWH) [Trigger]
Alignment tape (30HMP2-1)

State of VCR
1) Play the D-VHS alignment tape
2) Set to the D-VHS dubbing mode.

Adjustment Point
F.FWD button (remote control)
REW button (remote control)

Adjustment Procedure
1) Holding down the "VCR/DSS" button of the remote control, press the "STOP" button of the VCR to set to the D-VHS dubbing mode. (The D-VHS LED will light.)
2) Play the D-VHS alignment tape.
3) Press the "1"and "4" buttons of the remote control provided simultaneously and hold them, then press the "CHANNEL ▽ "(S2709) button of the VCR to set the VCR to the test mode. (Check that "TEST" appears in the display.)
4) Press the "CHANNEL △ , ▽ " buttons of the VCR to maximize the TP3501 output amplitude.
5) Press the "F.FWD" and "REW" buttons of the remote control so that it is 234us ± 15us from the leading edge of SWH waveform to the start of subcode.
6) Press the "STOP" button to release the test mode.

Waveforms



<Conditions of oscilloscope>
Trigger with CH-2.
Set the sync slope to "-".

6-2. X-value adjustment (Fig. 6)

Purpose:
To ensure compatibility with other VCRs.

Fault due to incomplete adjustment:
When a tape recorded by another VCR is played back, the tracking is not optimized and noise appears on the screen.

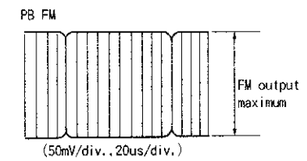
Test Equipment/Jigs and Connection Points
Oscilloscope CH-1: PG2508-1 (PB FM)
CH-2: PG2508-8 (SW30Hz)
Alignment tape (30HMP2-1)

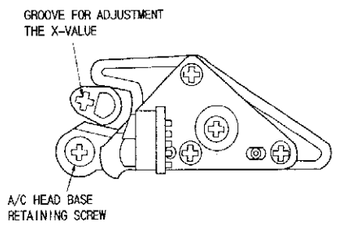
State of VCR
1) Play the alignment tape.
2) Set to the X-value adjustment test mode.

Adjustment Point
Groove for the adjustment X-value

Adjustment Procedure
1) Play the alignment tape.
2) Press the "1"and "4" buttons of the remote control provided simultaneously and hold them, then press the "CHANNEL ▽ "(S2709) button of the VCR to set the VCR to the test mode. (Check that "TEST" appears in the display.)
3) Loosen the screw holding the A/C head base (do not loosen it excessively).
4) Insert a screwdriver into the groove for adjusting the X-value and adjust so the FM output is maximum. There are two maximum FM output points when the groove for adjusting the X-value is turned. Adjust the FM output to a maximum when the groove is at the correct position as shown in the figure below.
5) Press the "STOP" button to release the test mode.

Waveforms





6-3. Forward slow tracking preset adjustment

Purpose:
To adjust the timing with which the brake pulse of the capstan motor is generated during slow play so that noise is minimum.

Fault due to incomplete adjustment:
Noise appears during slow play and the picture is not clear.

Test Equipment/Jigs and Connection Points
Monitor TV : Video output jack
Color bar generator: Video input jack
Blank tape (T-120)

State of VCR
Slow tracking: Unplug the power cord to set the slow tracking to the center.

Adjustment Point
CHANNEL △ (S2708)
CHANNEL ▽ (S2709)

Adjustment Procedure
1) Record a signal on the middle of a T-120 blank tape in the EP mode and play it back using the same VCR.
2) Press the "1"and "4" buttons of the remote control provided simultaneously and hold them, then press the "PLAY"(S2701) button of the VCR to set the VCR to the forward slow test mode.
3) Use the CHANNEL buttons so the slow feed noise appears across the bottom of the monitor screen and then it is driven out from the bottom of the screen.
4) Check that no noise appears on the monitor screen.
5) Press the "PLAY" button to return the VCR to the playback mode (the preset data is written to the EEPROM).
6) Perform the same procedure for SP slow tracking preset adjustment.
Do not press the reset switch after adjustment when the power is not turned on as the preset value could drift. If the preset value drifts, turn the power on and press the reset switch again for recovery.

6-4. Reverse slow tracking preset adjustment

Purpose:
To adjust the timing with which the brake pulse of the capstan motor is generated during reverse slow play so that noise is minimum.

Fault due to incomplete adjustment:
Noise appears during reverse slow play and the picture is not clear.

Test Equipment/Jigs and Connection Points
Monitor TV : Video output jack
Color bar generator: Video input jack
Blank tape (T-120)

State of VCR
Slow tracking: Unplug the power cord to set the slow tracking to the center.

Adjustment Point
CHANNEL △ (S2708)
CHANNEL ▽ (S2709)

Adjustment Procedure
1) Record a signal on the middle of a T-120 blank tape in the EP mode and play it back using the same VCR.
2) Press the "1" and "4" buttons of the remote control provided simultaneously during still play and hold them, then press the "PLAY" button (S2701) to set the VCR to the reverse slow test mode.
3) Use the CHANNEL buttons so the slow feed noise appears across the bottom of the monitor screen and then it is driven out from the bottom of the screen.
4) Check that no noise appears on the monitor screen.
5) Press the "PLAY" button to return the VCR to the playback mode (the preset data is written to the EEPROM).
6) Perform the same procedure for SP reverse slow tracking preset adjustment.
Do not press the reset switch after adjustment when the power is not turned on as the preset value could drift. If the preset value drifts, turn the power on and press the reset switch again for recovery.

7. Audio/MTS Circuit Adjustments

7-1. Hi-Fi audio playback level check

Purpose:
To set the playback level of the Hi-Fi audio signal to the specified value.

Fault due to incomplete adjustment:
The appropriate volume cannot be obtained during playback.

Test Equipment/Jigs and Connection Points
Voltmeter
When checking L-CH:Audio output (L) jack
When checking R-CH:Audio output (R) jack
Hi-Fi alignment tape (24HMAF-2)

State of VCR
Play Hi-Fi alignment tape.

Adjustment procedure
Use the same checking procedure for both the L and R channels.
Check that the voltmeter reads -7.8dBs ± 2.0dBs.
If it cannot be confirmed, check the playback signal system.

7-2. MTS input level adjustment (Fig. 6)

Purpose:
To set the level of the MTS signal supplied to the MTS processor in IC1801 from the tuner/IF to the specified level.

Fault due to incomplete adjustment:
1) The S/N deteriorates or distortion becomes conspicuous.
2) Stereo separation deteriorates.

Test Equipment/Jigs and Connection Points
MTS sound signal generator: IN FORM ANT
Voltmeter: PG2509-2

State of VCR
E-E mode

Adjustment Point
RT1801

Adjustment procedure
1) RT1801: Set the reading of the voltmeter to -20.0dBs ± 0.5dBs.

Notes:
MTS sound signal generator settings:
1) Audio frequency: 300Hz
2) Modulation signal: L+R
Monitor TV settings:
1) Press the "GUIDE" button of the remote control to display the menu on the monitor TV screen.
2) Press "2" of the remote control.
3) Press "6" of the remote control to select the SAP option and switch it from OFF to ON.

8. Digital Circuit Adjustments

8-1. PLL free-run frequency adjustment (Fig. 7)

Purpose:
To adjust the free-running frequency of clock signal for AD conversion output from the PLL IC.

Fault due to incomplete adjustment:
The clock and data input to the AD converter are not synchronized, and normal D-VHS playback is impossible.

Test Equipment/Jigs and Connection Points
Frequency counter: PG3516-3 (ADCK)

State of VCR
Set to the D-VHS test mode.

Adjustment Point
RT3501

Adjustment procedure
1) Holding down the "1" and "4" buttons of the remote control simultaneously in the eject state, press the "EJECT" button of the VCR to set to the D-VHS test mode. (The D-VHS LED will flash.)
2) Short PG3516 pins 1 and 4, and pins 2 and 5.
3) RT3501: The frequency counter reads 19.14 ± 0.05 MHz.
4) Holding down the "1" and "4" buttons of the remote control simultaneously again in the eject state, press the "EJECT" button of the VCR to release the D-VHS test mode.

8-2. Digital Rec level adjustment (Fig. 7, 8)

Purpose:
To adjust the D-VHS recording signal level.

Fault due to incomplete adjustment:
The cylinder output level drops during D-VHS playback, and normal D-VHS playback is impossible.

Test Equipment/Jigs and Connection Points
Oscilloscope CH-1: TP3101 [DPR board]
CH-2: PG3516-7 (SWH)[Trigger]
D-VHS alignment tape
Blank tape (S-VHS)
D-VHS VCR for playback (another VT-DX815A)

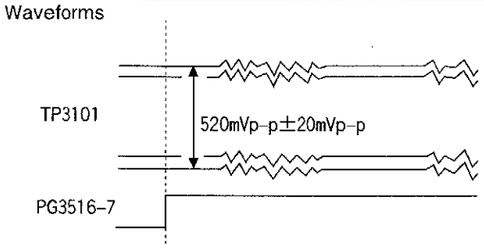
State of VCR
Set to the D-VHS dubbing mode.

Adjustment Point
RT3553

Adjustment procedure
Setting the playback D-VHS VCR:
1) Load the D-VHS alignment tape in a D-VHS VCR.
2) Holding down the "VCR/DSS" button of the remote control, press the "STOP" button of the VCR to set to the D-VHS dubbing mode. (The D-VHS LED will light.)
Setting the recording VCR (this unit):
3) Load an S-VHS tape in the VCR.
4) Holding down the "VCR/DSS" button of the remote control, press the "STOP" button of the VCR to set to the D-VHS dubbing mode. (The D-VHS LED will light.)
5) Use a digital A/V cable to connect both VCRs and perform digital recording.

6) Connect an oscilloscope to TP3101. Caution: Do not connect a monitor TV to the oscilloscope.
7) RT3553: Set the amplitude at TP3101 to 520mV ± 20mVp-p.

Waveforms



8-3. AD timing adjustment (Fig. 7)

Purpose:
To adjust the phases of clock and data input to the AD converter.

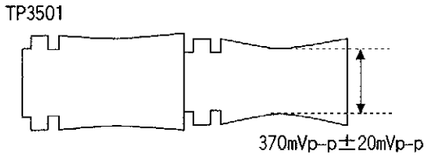
Fault due to incomplete adjustment:
Normal D-VHS playback is impossible.

Test Equipment/Jigs and Connection Points
Frequency counter: PG3516-6 (C1F)
Oscilloscope CH-1: PG3516-6 (C1F)
CH-2: TP3501 (PB OUT)
PG3516-7 (SWH)[Trigger]
Blank tape (S-VHS)

State of VCR
1) Set to the D-VHS dubbing mode.
2) Play the D-VHS alignment tape.

Adjustment Point
RT3502

Adjustment procedure
1) Holding down the "VCR/DSS" button of the remote control, press the "STOP" button of the VCR to set to the D-VHS dubbing mode. (The D-VHS LED will light.)
2) Load an S-VHS tape, record something and play it back in the D-VHS mode using the same VCR (no input signal is needed).
3) Press the "CHANNEL △, ▽" buttons of the VCR to set the minimum TP3501 output amplitude to 370 ± 20 mVp-p.



4) Connect a frequency counter and oscilloscope to PG3516 pin 6.
5) RT3502: Minimize the reading on the frequency counter and the number of pulses on the oscilloscope. Make sure that the frequency reads less than 1000 Hz.
6) Eject the alignment tape, and reinsert it to activate auto tracking.
7) Make sure that the frequency reads less than 50Hz.

Calibrate probe used to measure TP3501 by the following procedure:
Method for calibrating probe (9.57 MHz)
1) Connect the probe to be calibrated to the 1MHz terminated input jack of a spectrum analyzer.
2) Set the spectrum analyzer as follows:
a. Set for measuring amplitude,
b. Center frequency: 9.57 MHz,
c. Frequency span: 0 MHz,
d. RBW: 3 kHz,
e. VBW: 10 kHz,
f. Sweep time: 100 ms,
g. Reference level: -35 dB,
h. Tracking generator output level: -20 dB,
i. Tracking generator output specification: 50 Ω ,
j. Vertical axis setting: 1 dB/div.
3) Attach a 50 Ω terminator to the tracking generator jack of spectrum analyzer.
4) Touch the tracking generator jack of spectrum analyzer with the probe to be calibrated, and adjust the trimming volume on the probe so that the value measured by the spectrum analyzer is -40 ± 0.05 dB. Perform the adjustment after the spectrum analyzer warms up sufficiently and its performance is stabile. (It is recommended that the adjustment be made at least two hours after power is turned on.)

9. List of Hidden Commands

The following tables list the mode setting commands during adjustment and EEPROM initial setting commands.

9-1. Mode setting commands during adjustment

Item	Mode in which command is accepted	Operation	Remarks
Tracking center	Play	Press the "1" and "4" buttons of the remote control simultaneously.	
X-value adjustment test mode	Play	Press the "1" and "4" buttons of the remote control simultaneously and press the "CHANNEL ▽ " button on the VCR.	"tESt" appears
Forward slow test mode	Play	Press the "1" and "4" buttons of the remote control simultaneously and press the "PLAY" button on the VCR.	"SLOW" appears
Reverse slow test mode	Still play	Press the "1" and "4" buttons of the remote control simultaneously and press the "PLAY" button on the VCR.	"-SLOW" appears
D-VHS Test mode	Eject	Press the "1" and "4" buttons of the remote control simultaneously and press the "EJECT" button on the VCR.	"D-VHS" flashes

9-2. EEPROM initialization commands

Item	Mode in which command is accepted	Operation	Remarks
Shipment mode initial setting	EJECT	Press the "REC" button on the VCR and hold it, then press the "RESET" button used to initialize the microprocessor.	Hold the "REC" button depressed and release it after the display lights.
Clearing of trouble display	———	Press the "PLAY" button on the VCR and hold it, then press the "RESET" button used to initialize the microprocessor.	Hold the "PLAY" button depressed and release it after the display lights.

10. List of Data in EEPROM and Initial Settings

The table below lists the data stored in ROM. It also shows the data set by shipment mode initialization and when the trouble display is cleared.

Information	Data memory ROM	List of initial data	
	IC903 VCR EEPROM	Shipment mode initial data	Clearing of trouble display
Tuned channel data	Yes	Yes	No
VCR mode select data	Yes	Yes	No
Trouble display data	Yes	Yes	Yes
Slow tracking data	Yes	No (set by adjust)	No
Switching point data	Yes	No (set by adjust)	No

11. Initial Settings of IC903 (EEPROM)

The following shows the on-screen display and modes of switches when IC903 (EEPROM) is initialized.

[A] D-VHS SETUP MENU (in menu)
- 1 D-VHS AUTO MODE [ON]

[B] VCR SETUP MENU (in menu)
- 1 AUTO BLUE [OFF]
- 4 AUDIO SETUP [Hi-Fi]
- 5 AUDIO SETUP [STEREO]
- 6 AUDIO SETUP [SAP OFF]

[C] CHANNEL PRESET (in menu)
- 1 CHANNEL [CATV1]

[D] Other modes
- Recording speed : EP

[E] Front panel switch
- ANT. OUT : RFCH 03

12. Caution When Replacing IC903 (VCR EEPROM)

After replacing IC903 (VCR EEPROM), execute the VCR initial settings and then perform the following adjustments.

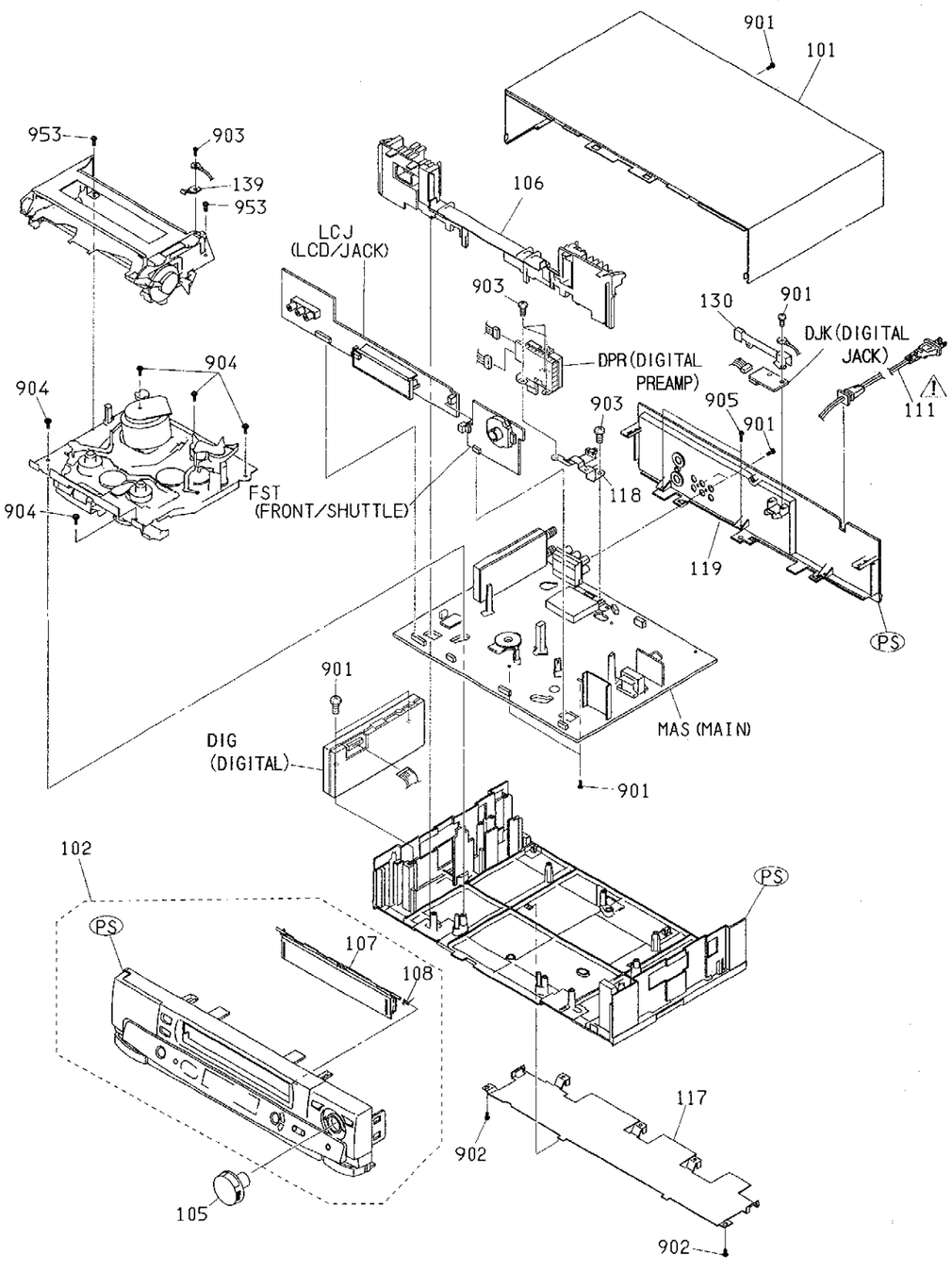
	Adjustment	Page
1	Forward slow tracking adjustment	P3-5
2	Reverse slow tracking adjustment	P3-5

MEMO

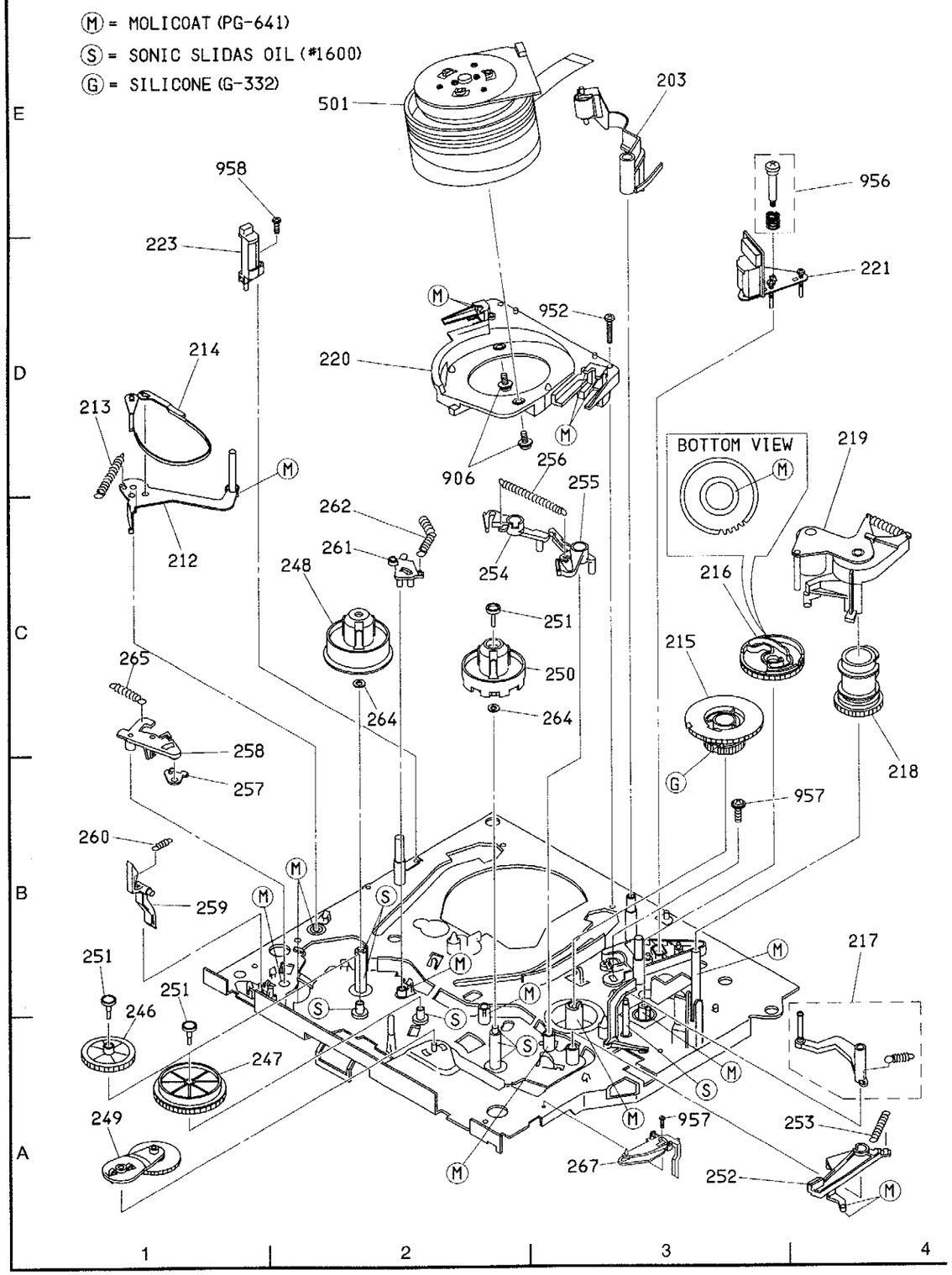
CHAPTER 4 EXPLODED VIEW

1. CABINET SECTION

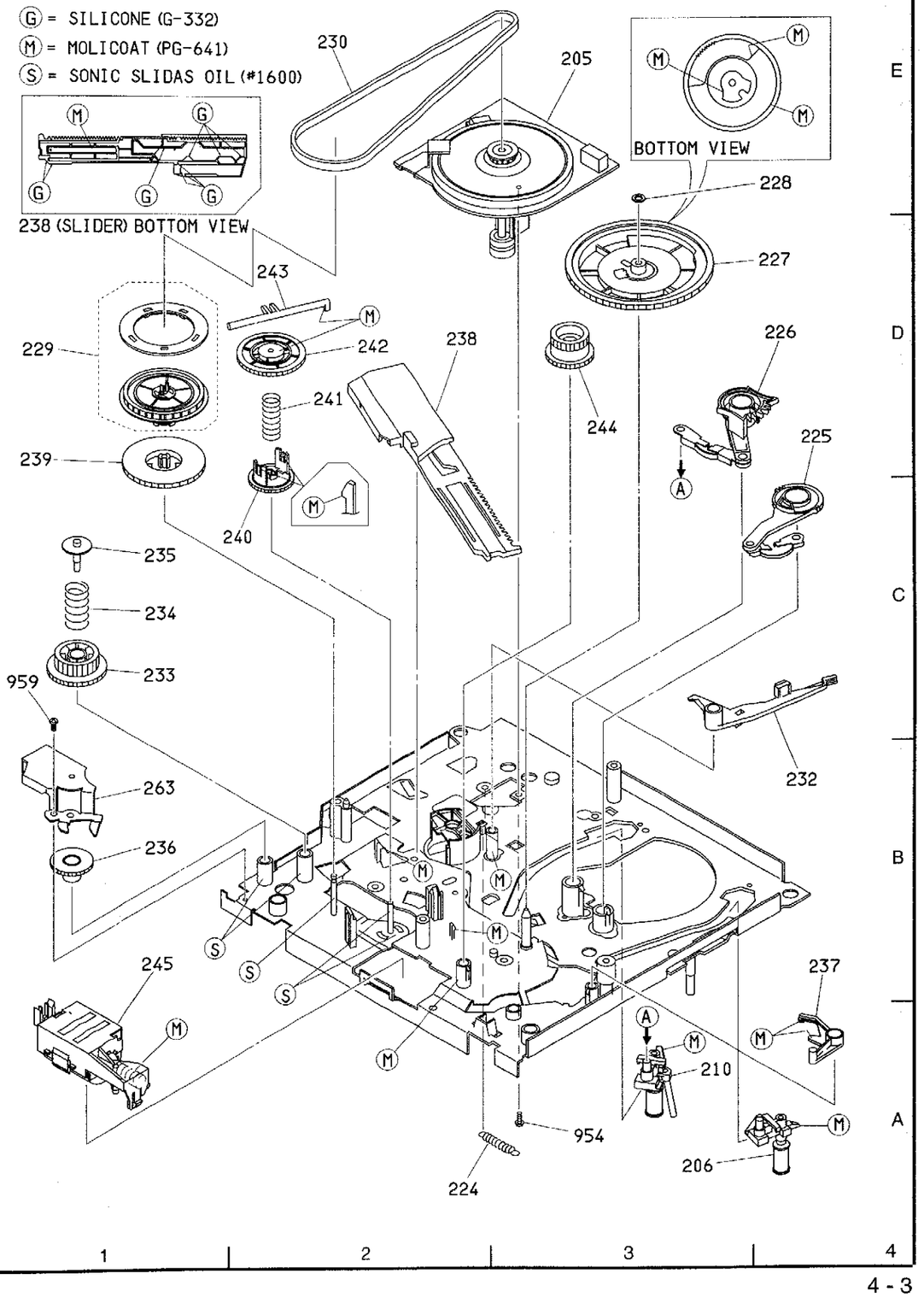
NOTE: The synthetic resin members that can be dismantled are shown by abbreviations using letters.



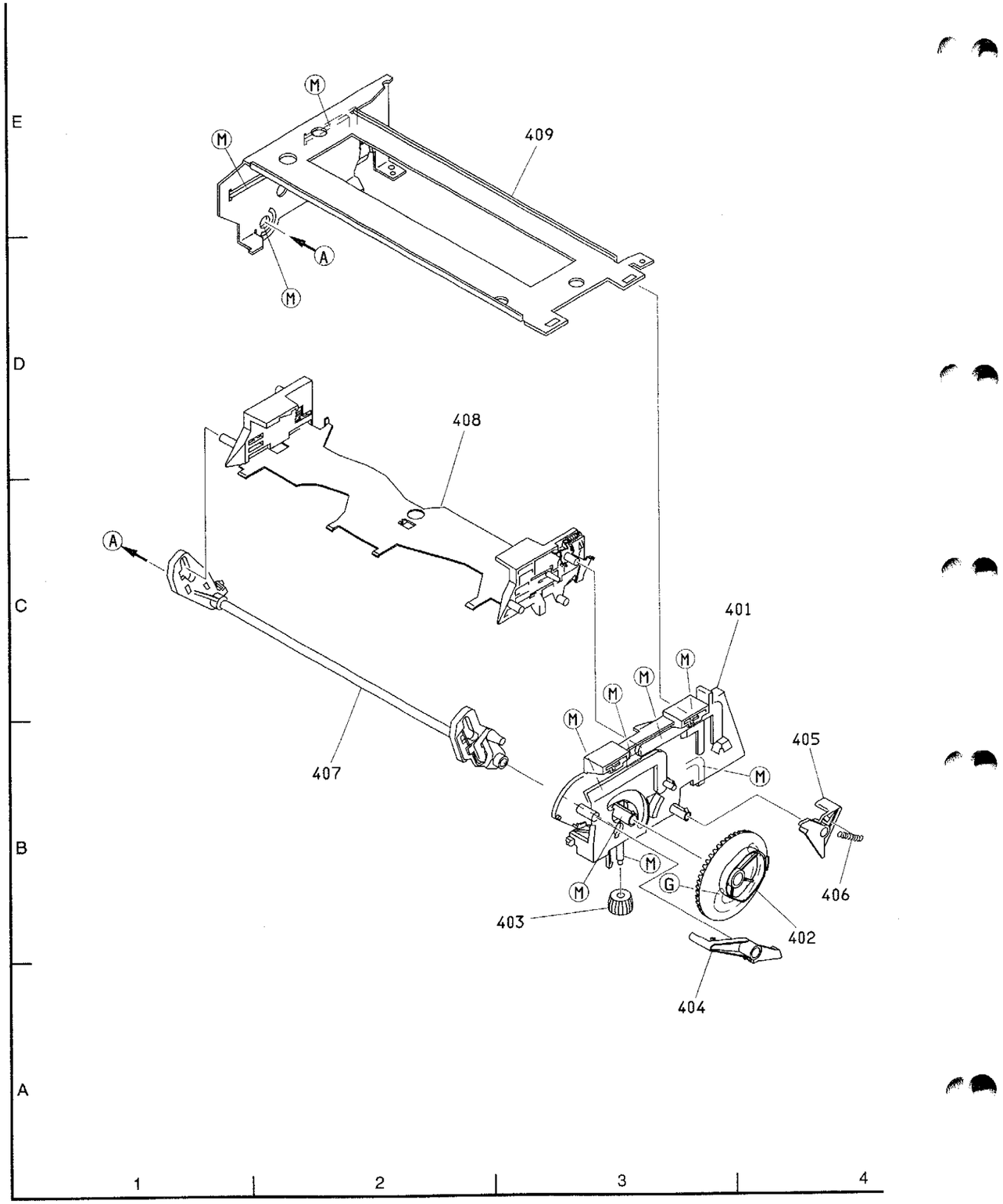
2. US-MECHANISM (TOP VIEW) SECTION



3. US-MECHANISM (BOTTOM VIEW) SECTION



4. US-FL MECHANISM SECTION



CHAPTER 5 REPLACEMENT PARTS LIST

1. MECHANICAL PARTS LIST

SYMBOL-NO	P-NO	DESCRIPTION
		MECHANISM SECTION
101	QA11511	COVER, TOP (HEPM)
102	PH14196	PANEL, FRONT
105	PC12551	KNOB, SHUTTLE (HEPM)
106	NT10733	PIECE, FRONT (HEPM)
107	PH14271	DOOR, CASSETTE (HEPM)
108	KL11522	SPRING, DOOR (HEPM)
⚠111	5850663	CORD, AC
117	QA11521	COVER, BOTTOM (HEPM)
118	MD11444	COVER, FLEXIBLE
119	PH14292	PANEL, REAR
130	MD11731	PLATE, EARTH
139	4826834	SPRING, EARTH
203	KX11662	HEAD CLEANING MECHA
205	GP10252	MOTOR, CAPSTAN
206	KX12294	BASE, GUIDE ROLLER (I)
210	KX12302	BASE, GUIDE ROLLER(O)
212	KX11531	ARM, TENSION
213	KL10662	SPRING
214	KX11631	BAND, TENSION
215	KF10641	GEAR, DRIVE
216	KF10701	GEAR, IDLER
217	KX12662	ARM, OUT
218	KX11581	GEAR, SPIRAL
219	KX11554	ARM, PINCH ROLLER
220	KX11451	BASE, CYLINDER
221	KX11945	AC HEAD
223	5423082	FE HEAD
224	KL10711	SPRING
225	KX11591	GEAR, LOADING(L)
226	KX11611	GEAR, LOADING(R)
227	KF10673	GEAR, CAM
228	4344643	WASHER
229	KX11444	PULLEY
230	KX11522	BELT
232	KX12031	BRAKE
233	KF10571	GEAR, CHANGE
234	KL10771	SPRING
235	KX12001	STOPPER, SPRING
236	KF10561	GEAR, IDLER
237	KX11831	ARM, OPERATION
238	KX11362	SLIDER
239	KF10551	GEAR, TRANS
240	KF10501	GEAR, DRIVE
241	KL10773	SPRING
242	KF10513	GEAR, CHANGE
243	KX11411	ARM, CHANGE
244	KX11371	GEAR
245	KX11892	MOTOR, LOADING
246	KF10521	GEAR, IDLER 1
247	KF10532	GEAR, IDLER 2
248	KH10152	REEL, TABLE(S)
249	KX11423	ARM
250	KH10161	REEL, TABLE(T)
251	KX11991	STOPPER
252	KX11861	BRAKE
253	KL10782	SPRING, BRAKE
254	KX11875	BRAKE, L
255	KX11883	BRAKE, R
256	KL10792	SPRING, BRAKE
257	KF10542	GEAR, JOG
258	KX13132	ARM, JOG
259	KX11841	ARM, REC
260	6542485	SPRING
261	KX11811	BRAKE, SUB
262	KL10903	SPRING, SUB
263	KX12461	BRACKET, BASE
264	MN11571	WASHER
265	KL11062	SPRING, JOG
267	KX12742	ARM, SWITCH
401	KX11773	BRACKET (R)
402	KF10682	GEAR 1
403	KF10691	GEAR 2
404	KX11752	ARM, DOOR
405	KX11761	ARM, SWITCH
406	6323723	SPRING
407	KX11931	ARM, DRIVE
408	KX11922	HOLDER, CASSETTE
409	KX11741	BRACKET(L)
501	HQ10336	MOTOR, CYLINDER
901	8699410	SCREW(3X10)
902	MK10271	SCREW(3X12DT)
903	8671306	SCREW(2.6X6)
904	7781132	BT SCREW
905	7784323	SCREW(3X8)
906	8650408	SCREW
952	0671310	DT SCREW-2.6MMDX10MM
953	0671306	DT SCREW 2.6MMDX6MM
954	8691306	BT SCREW 2.6MM
956	KX12443	SCREW
957	MJ10341	SCREW(M2.6)
958	0671308	DT SCREW-2.6MMDX8MM
959	0671305	DT SCREW-2.6MMDX5MM
		ACCESSARIES
802	5861682	CABLE, RF
803	EW11381	CABLE, DIGITAL A/V
804	HL10702	REMOTE HAND SET (VT-RM815A)

SYMBOL-NO	P-NO	DESCRIPTION
		CAPACITORS
C0201	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0204	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0205	0893031	CERAMIC CHIP 1000PF+-10% 50V
C0208	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0209	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0211	0800185	ELECTROLYTIC 47UF 6.3V
C0212	0890043	CERAMIC DISC 0.01UF+-20% 16V
C0213	0800177	ELECTROLYTIC 3.3UF 50V
C0214	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0215	0800177	ELECTROLYTIC 3.3UF 50V
C0216	0209948	CERAMIC CHIP 330PF+-5% 50V
C0218	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0219	0893031	CERAMIC CHIP 1000PF+-10% 50V
C0220	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0221	0800176	ELECTROLYTIC 2.2UF 50V
C0222	0893039	CERAMIC CHIP 4700PF+-10% 50V
C0223	0800178	ELECTROLYTIC 4.7UF 35V
C0224	0209936	CERAMIC CHIP 33PF+-5% 50V
C0225	0209946	CERAMIC CHIP 220PF+-5% 50V
C0226	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0227	0800174	ELECTROLYTIC 0.47UF 50V
C0228	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C0230	0893002	CERAMIC CHIP 0.033UF+-10% 16V
C0233	0800179	ELECTROLYTIC 10UF 16V
C0234	0800185	ELECTROLYTIC 47UF 6.3V
C0235	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0236	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0237	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0238	0800178	ELECTROLYTIC 4.7UF 35V
C0239	0800179	ELECTROLYTIC 10UF 16V
C0240	0800179	ELECTROLYTIC 10UF 16V
C0241	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0242	0800178	ELECTROLYTIC 4.7UF 35V
C0243	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0244	0254455	ELECTROLYTIC 0.47UF+-20% 50V
C0245	0800177	ELECTROLYTIC 3.3UF 50V
C0246	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0247	0209936	CERAMIC CHIP 33PF+-5% 50V
C0249	0893013	CERAMIC CHIP 0.22UF+-10% 16V
C0251	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C0252	0209943	CERAMIC DISC 120PF+-5% 50V
C0254	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0255	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0256	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0258	0209933	CERAMIC CHIP 18PF+-5% 50V
C0260	0209931	CERAMIC CHIP 12PF+-5% 50V
C0263	0890009	CERAMIC DISC 12PF+-5% 50V
C0264	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0265	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0273	0209937	CERAMIC CHIP 39PF+-5% 50V
C0402	0800117	ELECTROLYTIC 4.7UF 25V
C0403	0893002	CERAMIC CHIP 0.033UF+-10% 16V
C0404	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0407	0800122	ELECTROLYTIC 10UF 16V
C0408	0800122	ELECTROLYTIC 10UF 16V
C0409	0209906	CERAMIC DISC 820PF+-5% 50V
C0410	0893046	CERAMIC CHIP 0.015UF+-10% 50V
C0411	0800109	ELECTROLYTIC 1.0UF 50V
C0412	0207405	ELECTROLYTIC 0.1UF+-20% 50V
C0413	0207405	ELECTROLYTIC 0.1UF+-20% 50V
C0414	0800109	ELECTROLYTIC 1.0UF 50V
C0419	0800122	ELECTROLYTIC 10UF 16V

SYMBOL-NO	P-NO	DESCRIPTION
C0865	0204284	ELECTROLYTIC 0.047UF 250V
C0866	0880053	POLYESTER FILM 0.047UF+-10% 50V
C0867	0880042	MYLAR 6800PF+-10% 50V
C0868	0880035	POLYESTER FILM 0.0022UF+-10% 50V
C0870	0254403	CAPACITOR 22UF+-20% 50V
C0871	0254405	CAPACITOR 1000UF+-20% 25V
C0872	0800354	ELECTROLYTIC 470UF 25V
C0873	0254325	ELECTROLYTIC 2200UF 16V
C0874	0800352	ELECTROLYTIC 470UF 10V
C0875	0880044	POLYESTER FILM 0.01UF+-10% 50V
C0876	0800308	ELECTROLYTIC 33UF 16V
C0878	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C0882	0800047	ELECTROLYTIC 100UF 6.3V
C0885	AJ10138R	CERAMIC CAPACITOR 560PF+-10% 500V
C0886	0890035	CERAMIC DISC 1000PF+-10% 50V
C0888	1143005	CERAMIC CAPACITOR 220PF+-5% 1KV
C0901	0893086	CERAMIC CHIP 0.1UF+80-20% 50V
C0902	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0904	0217516	CAPACITOR 0.047UF+80-20% 5.5V
C0906	0800176	ELECTROLYTIC 2.2UF 50V
C0907	0209927	CERAMIC CHIP 7.0PF+-0.5% 50V
C0908	0209927	CERAMIC CHIP 7.0PF+-0.5% 50V
C0909	0209931	CERAMIC CHIP 12PF+-5% 50V
C0910	0209932	CERAMIC CHIP 15PF+-5% 50V
C0912	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C0913	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0914	0800184	ELECTROLYTIC 33UF 25V
C0915	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0916	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0917	0800186	ELECTROLYTIC 47UF 16V
C0918	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C0919	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C0922	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C0923	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0924	0209945	CERAMIC DISC 180PF+-5% 50V
C0925	0209938	CERAMIC CHIP 47PF+-5% 50V
C0926	0209947	CERAMIC DISC 270PF+-5% 50V
C0928	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C0940	0209943	CERAMIC DISC 120PF+-5% 50V
C0951	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C0952	0890043	CERAMIC DISC 0.01UF+-20% 16V
C0973	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0974	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0980	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0981	0890043	CERAMIC DISC 0.01UF+-20% 16V
C0985	0890032	CERAMIC DISC 560PF+-10% 50V
C1114	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1115	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1116	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1117	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1118	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1119	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1120	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1121	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1122	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1123	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1124	0893031	CERAMIC CHIP 1000PF+-10% 50V
C1125	0800185	ELECTROLYTIC 47UF 6.3V
C1126	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1127	0893013	CERAMIC CHIP 0.22UF+-10% 16V
C1128	0800185	ELECTROLYTIC 47UF 6.3V
C1129	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1131	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1132	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1133	0893031	CERAMIC CHIP 1000PF+-10% 50V

SYMBOL-NO	P-NO	DESCRIPTION
C1137	0209935	CERAMIC CHIP 27PF+-5% 50V
C1140	0209943	CERAMIC DISC 120PF+-5% 50V
C1141	0800185	ELECTROLYTIC 47UF 6.3V
C1401	0890043	CERAMIC DISC 0.01UF+-20% 16V
C1402	0209943	CERAMIC DISC 120PF+-5% 50V
C1403	0800178	ELECTROLYTIC 4.7UF 35V
C1404	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1405	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1409	0209937	CERAMIC CHIP 39PF+-5% 50V
C1410	0209936	CERAMIC CHIP 33PF+-5% 50V
C1411	0209945	CERAMIC DISC 180PF+-5% 50V
C1413	0893082	CERAMIC CHIP 0.022UF+80-20% 50V
C1414	0800179	ELECTROLYTIC 10UF 16V
C1415	0800178	ELECTROLYTIC 4.7UF 35V
C1416	0800041	ELECTROLYTIC 47UF 16V
C1417	0893079	CERAMIC DISC 0.01UF+80-20% 50V
C1419	0209931	CERAMIC CHIP 12PF+-5% 50V
C1424	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1425	0209931	CERAMIC CHIP 12PF+-5% 50V
C1427	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C1428	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1430	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1701	0800185	ELECTROLYTIC 47UF 6.3V
C1702	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C1703	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C1704	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C1705	0890035	CERAMIC DISC 1000PF+-10% 50V
C1706	0800185	ELECTROLYTIC 47UF 6.3V
C1707	0800176	ELECTROLYTIC 2.2UF 50V
C1708	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C1802	0800179	ELECTROLYTIC 10UF 16V
C1811	0800186	ELECTROLYTIC 47UF 16V
C2101	0893073	CERAMIC CHIP 1000PF+80-20% 50V
C2102	0893073	CERAMIC CHIP 1000PF+80-20% 50V
C2503	0800352	ELECTROLYTIC 470UF 10V
C2504	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2505	0800179	ELECTROLYTIC 10UF 16V
C2506	0800179	ELECTROLYTIC 10UF 16V
C2507	0800178	ELECTROLYTIC 4.7UF 35V
C2508	0893037	CERAMIC CHIP 3300PF+-10% 50V
C2509	0800178	ELECTROLYTIC 4.7UF 35V
C2513	0800186	ELECTROLYTIC 47UF 16V
C2514	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2517	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2518	0800044	ELECTROLYTIC 47UF 50V
C2519	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2520	0800353	ELECTROLYTIC 470UF 16V
C2524	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2525	0800179	ELECTROLYTIC 10UF 16V
C2531	0800287	CAPASITOR 4.7UF+-20% 35V
C2532	0893063	CERAMIC CHIP 0.022UF+80-20% 25V
C2533	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2535	0800317	ELECTROLYTIC 47UF 16V
C2536	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2537	0800186	ELECTROLYTIC 47UF 16V
C2540	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C2541	0800186	ELECTROLYTIC 47UF 16V
C2542	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C2556	0800178	ELECTROLYTIC 4.7UF 35V
C2561	0800141	ELECTROLYTIC 47UF 16V
C2562	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2563	0800112	ELECTROLYTIC 2.2UF 50V
C2564	0800112	ELECTROLYTIC 2.2UF 50V
C2565	0800153	ELECTROLYTIC 470UF 6.3V
C3105	0893055	CERAMIC CHIP 0.1UF+80-20% 16V

SYMBOL-NO	P-NO	DESCRIPTION
C3108	0800186	ELECTROLYTIC 47UF 16V
C3111	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3115	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3122	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3132	0893079	CERAMIC DISC 0.01UF+80-20% 50V
C3133	0209938	CERAMIC CHIP 47PF+-5% 50V
C3135	0209934	CERAMIC CHIP 22PF+-5% 50V
C3141	0893079	CERAMIC DISC 0.01UF+80-20% 50V
C3142	0893079	CERAMIC DISC 0.01UF+80-20% 50V
C3143	0893079	CERAMIC DISC 0.01UF+80-20% 50V
C3144	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3151	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C3152	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3153	0893079	CERAMIC DISC 0.01UF+80-20% 50V
C3154	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3155	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C3156	0893079	CERAMIC DISC 0.01UF+80-20% 50V
C3157	0893079	CERAMIC DISC 0.01UF+80-20% 50V
C3173	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3175	0806168	ELECTROLYTIC 47UF 6.3V
C3181	0800185	ELECTROLYTIC 47UF 6.3V
C3182	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3185	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3186	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3187	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3189	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3190	0209904	CERAMIC DISC 560PF+-5% 50V
C3191	0806168	ELECTROLYTIC 47UF 6.3V
C3201	0800187	ELECTROLYTIC 100UF 6.3V
C3202	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3203	0800176	ELECTROLYTIC 2.2UF 50V
C3204	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3223	0800185	ELECTROLYTIC 47UF 6.3V
C3224	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3225	0893079	CERAMIC DISC 0.01UF+80-20% 50V
C3227	0893079	CERAMIC DISC 0.01UF+80-20% 50V
C3237	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3238	0209854	CERAMIC DISC 330PF+-5% 50V
C3299	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3451	0893014	CERAMIC CHIP 0.01UF+-10% 25V
C3452	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3453	0800176	ELECTROLYTIC 2.2UF 50V
C3454	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3455	0800185	ELECTROLYTIC 47UF 6.3V
C3456	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3457	0800176	ELECTROLYTIC 2.2UF 50V
C3458	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3459	0800185	ELECTROLYTIC 47UF 6.3V
C3460	0800187	ELECTROLYTIC 100UF 6.3V
C3461	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3462	0209943	CERAMIC DISC 120PF+-5%
C3465	0893031	CERAMIC CHIP 1000PF+-10% 50V
C3466	0209940	CERAMIC CHIP 68PF+-5% 50V
C3501	0800185	ELECTROLYTIC 47UF 6.3V
C3502	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3503	0209934	CERAMIC CHIP 22PF+-5% 50V
C3504	0893014	CERAMIC CHIP 0.01UF+-10% 25V
C3505	0893014	CERAMIC CHIP 0.01UF+-10% 25V
C3506	0209934	CERAMIC CHIP 22PF+-5% 50V
C3507	0893014	CERAMIC CHIP 0.01UF+-10% 25V
C3508	0209934	CERAMIC CHIP 22PF+-5% 50V
C3509	0893014	CERAMIC CHIP 0.01UF+-10% 25V
C3510	0800185	ELECTROLYTIC 47UF 6.3V
C3511	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3512	0893055	CERAMIC CHIP 0.1UF+80-20% 16V

SYMBOL-NO	P-NO	DESCRIPTION
C3513	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3514	0893014	CERAMIC CHIP 0.01UF+-10% 25V
C3515	0893014	CERAMIC CHIP 0.01UF+-10% 25V
C3516	0893014	CERAMIC CHIP 0.01UF+-10% 25V
C3517	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3518	0800185	ELECTROLYTIC 47UF 6.3V
C3519	0800185	ELECTROLYTIC 47UF 6.3V
C3520	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3522	0209933	CERAMIC CHIP 18PF+-5% 50V
C3523	0209939	CERAMIC CHIP 56PF+-5% 50V
C3552	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3553	0893049	CERAMIC CAPACITOR 0.027UF+-10% 50V
C3554	0800185	ELECTROLYTIC 47UF 6.3V
C3555	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3556	0209936	CERAMIC CHIP 33PF+-5% 50V
C3558	0800185	ELECTROLYTIC 47UF 6.3V
C3559	0893014	CERAMIC CHIP 0.01UF+-10% 25V
C3560	0893013	CERAMIC CHIP 0.22UF+-10% 16V
C3561	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3562	0893079	CERAMIC DISC 0.01UF+80-20% 50V
C3599	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3601	0800187	ELECTROLYTIC 100UF 6.3V
C3602	0893055	CERAMIC CHIP 0.1UF+80-20% 16V
C3603	0893079	CERAMIC DISC 0.01UF+80-20% 50V
C3604	0893079	CERAMIC DISC 0.01UF+80-20% 50V
C3605	0893031	CERAMIC CHIP 1000PF+-10% 50V
JP0407	0893035	CERAMIC CHIP 2200PF+-10% 50V
		RESISTORS
R0205	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R0207	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
R0208	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0212	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0213	0700058	CARBON FILM 22KOHM+-5% 1/8W
R0215	0103842	CHIP RESISTOR 820 OHM+-5% 0.1W
R0216	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R0217	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R0218	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W
R0226	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R0227	0700058	CARBON FILM 22KOHM+-5% 1/8W
R0228	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0229	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R0238	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R0240	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R0241	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R0243	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
R0253	0103841	CHIP RESISTOR 680 OHM+-5% 0.1W
R0257	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R0258	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W
R0263	0103881	CHIP RESISTOR 2.2MOHM+-10% 0.1W
R0265	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W
R0402	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R0403	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R0404	0103838	RESISTOR CHIP 390 OHM+-5% 0.1W
R0407	0103833	CHIP RESISTOR 150 OHM+-5% 0.1W
R0408	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R0409	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W
R0410	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0413	0700063	CARBON FILM 47KOHM+-5% 1/8W
R0414	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R0418	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0419	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R0420	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0421	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W

SYMBOL-NO	P-NO	DESCRIPTION
R0422	0103819	CHIP RESISTOR 10 OHM+-5% 0.1W
R0423	0103858	CHIP RESISTOR 18KOHM+-5% 0.1W
R0424	0700061	CARBON FILM 33KOHM+-5% 1/8W
R0425	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R0429	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0430	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0431	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0432	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0434	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R0435	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R0436	0700061	CARBON FILM 33KOHM+-5% 1/8W
R0437	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R0440	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0451	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0501	0700054	CARBON FILM 10KOHM+-5% 1/8W
R0502	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
R0503	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R0504	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0505	0700063	CARBON FILM 47KOHM+-5% 1/8W
R0506	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0509	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0510	0104252	CHIP RESISTOR 510 OHM+-5% 1/10W
R0511	AQ10296R	CHIP RESISTOR 15KOHM+-0.1% 1/10W
R0512	AQ10295R	CHIP RESISTOR 11KOHM+-0.1% 1/10W
R0516	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0517	0104252	CHIP RESISTOR 510 OHM+-5% 1/10W
R0520	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R0521	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0522	0700063	CARBON FILM 47KOHM+-5% 1/8W
R0523	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0524	0700054	CARBON FILM 10KOHM+-5% 1/8W
R0525	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
R0526	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R0527	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R0530	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
R0531	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
R0533	0103866	CHIP RESISTOR 82KOHM+-5% 0.1W
R0534	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0535	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R0536	0103834	CHIP RESISTOR 180 OHM+-5% 0.1W
R0537	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0538	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0539	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R0605	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R0615	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0621	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0622	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0623	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0624	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0625	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0626	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0627	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R0628	0700036	CARBON FILM 470 OHM+-5% 1/8W
R0629	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R0630	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R0631	0103870	CHIP RESISTOR 180KOHM+-5% 0.1W
R0632	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0633	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R0634	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0635	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0636	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R0637	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
⚠R0851	AT10231G	RESISTOR 4.7MOHM+-5% 1/2W
⚠R0852	AT10211M	CHIP RESISTOR 1MOHM 1/2W
R0853	0700074	CARBON FILM 330KOHM+-5% 1/8W

SYMBOL-NO	P-NO	DESCRIPTION
R0854	0700074	CARBON FILM 330KOHM+-5% 1/8W
R0855	0700074	CARBON FILM 330KOHM+-5% 1/8W
R0856	AT10244S	RESISTOR 0.47OHM+-5% 1W
R0857	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0858	AT10242S	RESISTOR 120 OHM+-5% 2W
R0860	0116664	CHIP RESISTOR 68KOHM+-5% 2W
R0861	0116664	CHIP RESISTOR 68KOHM+-5% 2W
R0862	0700048	CARBON FILM 3.9KOHM+-5% 1/8W
R0863	0700054	CARBON FILM 10KOHM+-5% 1/8W
R0864	0700033	CARBON FILM 270 OHM+-5% 1/8W
R0865	0700038	CARBON FILM 680 OHM+-5% 1/8W
R0866	0700034	CARBON FILM 330 OHM+-5% 1/8W
R0867	0700038	CARBON FILM 680 OHM+-5% 1/8W
R0868	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0869	0104114	CHIP RESISTOR 3.3KOHM+-1% 0.1W
R0871	0105572	METAL FILM RESISTOR 2.7KOHM+-1% 1/10W
R0872	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R0873	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R0874	0700058	CARBON FILM 22KOHM+-5% 1/8W
R0875	0700032	CARBON FILM 220 OHM+-5% 1/8W
R0878	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0879	0700038	CARBON FILM 680 OHM+-5% 1/8W
R0885	0700056	CARBON FILM 15KOHM+-5% 1/8W
R0886	0700056	CARBON FILM 15KOHM+-5% 1/8W
R0887	0700046	CARBON FILM 2.7KOHM+-5% 1/8W
R0889	0700067	CARBON FILM 100KOHM+-5% 1/8W
R0891	0700058	CARBON FILM 22KOHM+-5% 1/8W
R0892	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0893	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0894	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0901	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0902	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0903	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0904	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R0905	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0906	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0908	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0909	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R0910	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R0911	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0913	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0914	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0915	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0916	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0917	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0918	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0919	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0921	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0922	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0923	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0924	0103824	CHIP RESISTOR 27 OHM+-5% 0.1W
R0925	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W
R0926	0103824	CHIP RESISTOR 27 OHM+-5% 0.1W
R0927	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R0928	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0929	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0930	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0934	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R0935	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R0938	0700036	CARBON FILM 470 OHM+-5% 1/8W
R0939	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0940	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R0943	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0944	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0945	0700041	CARBON FILM 1.0KOHM+-5% 1/8W

SYMBOL-NO	P-NO	DESCRIPTION
R0946	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0947	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0948	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0951	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0952	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0954	0700073	CARBON FILM 270KOHM+-5% 1/8W
R0955	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R0956	0700036	CARBON FILM 470 OHM+-5% 1/8W
R0957	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R0967	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0971	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0972	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0976	0101725	CHIP RESISTOR 2.2 OHM+-5% 1/4W
R0977	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R0978	0101765	RESISTOR 10KOHM+-1% 1/8W
R0979	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R0980	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0981	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0983	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0984	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0985	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R0986	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0988	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R0991	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W
R0992	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W
R0993	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0994	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0995	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R0996	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R0997	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R0998	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0999	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R1107	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R1108	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R1109	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R1110	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1112	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1113	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1115	0103838	RESISTOR CHIP 390 OHM+-5% 0.1W
R1117	0700054	CARBON FILM 10KOHM+-5% 1/8W
R1118	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R1121	0700032	CARBON FILM 220 OHM+-5% 1/8W
R1151	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R1403	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R1405	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1406	0103828	CHIP RESISTOR 56 OHM+-5% 0.1W
R1407	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R1409	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1410	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R1412	0700076	CARBON FILM 470KOHM+-5% 1/8W
R1414	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R1416	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1418	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W
R1421	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W
R1422	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1423	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R1424	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R1430	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1432	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R1433	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R1434	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R1437	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R1438	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1439	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1441	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W

SYMBOL-NO	P-NO	DESCRIPTION
R1442	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R1701	0700036	CARBON FILM 470 OHM+-5% 1/8W
R1702	0700036	CARBON FILM 470 OHM+-5% 1/8W
R1703	0700038	CARBON FILM 680 OHM+-5% 1/8W
R1704	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R1705	0700067	CARBON FILM 100KOHM+-5% 1/8W
R1715	0700062	CARBON FILM 39KOHM+-5% 1/8W
R1716	0700047	CARBON FILM 3.3KOHM+-5% 1/8W
R1717	0700057	CARBON FILM 18KOHM+-5% 1/8W
R1718	0700038	CARBON FILM 680 OHM+-5% 1/8W
R1719	0700054	CARBON FILM 10KOHM+-5% 1/8W
R1720	0700051	CARBON FILM 5.6KOHM+-5% 1/8W
R1721	0700039	CARBON FILM 820 OHM+-5% 1/8W
R1722	0700048	CARBON FILM 3.9KOHM+-5% 1/8W
R1723	0700037	CARBON FILM 560 OHM+-5% 1/8W
R1724	0700047	CARBON FILM 3.3KOHM+-5% 1/8W
R1725	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R1726	0700035	CARBON FILM 390 OHM+-5% 1/8W
R1727	0700044	CARBON FILM 1.8KOHM+-5% 1/8W
R1728	0700054	CARBON FILM 10KOHM+-5% 1/8W
R1729	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R1730	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R1731	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R1732	0700063	CARBON FILM 47KOHM+-5% 1/8W
R1733	0700029	CARBON FILM 150 OHM+-5% 1/8W
R1734	0700033	CARBON FILM 270 OHM+-5% 1/8W
R1802	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R1806	0700054	CARBON FILM 10KOHM+-5% 1/8W
R1807	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R1808	0700053	CARBON FILM 8.2KOHM+-5% 1/8W
R1809	0700057	CARBON FILM 18KOHM+-5% 1/8W
R1818	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R1820	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R1822	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R1951	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R1955	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R2101	0700059	CARBON FILM 27KOHM+-5% 1/8W
R2102	0103865	CHIP RESISTOR 68KOHM+-5% 0.1W
R2103	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R2104	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R2105	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R2106	0103893	CHIP RESISTOR 75 OHM+-5% 1/8W
R2107	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R2108	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
R2109	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R2110	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
R2111	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R2112	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R2113	0103893	CHIP RESISTOR 75 OHM+-5% 1/8W
R2114	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R2115	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R2116	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R2117	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R2118	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R2119	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R2501	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R2502	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R2503	0101400	CARBON FILM 75 OHM+-5% 1/8W
R2504	0103827	CHIP RESISTOR 47 OHM+-5% 0.1W
R2507	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R2508	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R2509	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R2510	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R2511	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R2512	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W

SYMBOL-NO	P-NO	DESCRIPTION
R2514	0101835	CARBON FILM 1.5KOHM+-5% 1/4W
R2515	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W
R2517	0103870	CHIP RESISTOR 180KOHM+-5% 0.1W
R2518	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R2523	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R2524	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R2525	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R2526	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R2527	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R2530	0103827	CHIP RESISTOR 47 OHM+-5% 0.1W
R2533	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R2534	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R2535	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R2536	0103824	CHIP RESISTOR 27 OHM+-5% 0.1W
R2537	0103824	CHIP RESISTOR 27 OHM+-5% 0.1W
R2538	0103829	CHIP RESISTOR 68 OHM+-5% 0.1W
R2539	0103834	CHIP RESISTOR 180 OHM+-5% 0.1W
R2540	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R2541	0103836	CHIP RESISTOR 270 OHM+-5% 0.1W
R2542	0700054	CARBON FILM 10KOHM+-5% 1/8W
R2551	0103841	CHIP RESISTOR 680 OHM+-5% 0.1W
R2552	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R2553	0103838	RESISTOR CHIP 390 OHM+-5% 0.1W
R2554	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R2555	0700039	CARBON FILM 820 OHM+-5% 1/8W
R2556	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R2557	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R2558	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R2561	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R2562	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R2701	0700057	CARBON FILM 18KOHM+-5% 1/8W
R2702	0700054	CARBON FILM 10KOHM+-5% 1/8W
R2703	0700057	CARBON FILM 18KOHM+-5% 1/8W
R2704	0700054	CARBON FILM 10KOHM+-5% 1/8W
R2706	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R2707	0700039	CARBON FILM 820 OHM+-5% 1/8W
R2708	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R2709	0700027	CARBON FILM 100 OHM+-5% 1/8W
R2710	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R2711	0700032	CARBON FILM 220 OHM+-5% 1/8W
R2712	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R2713	0700029	CARBON FILM 150 OHM+-5% 1/8W
R2714	0700043	CARBON FILM 1.5KOHM+-5% 1/8W
R3125	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R3128	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R3129	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R3130	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R3131	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R3132	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R3133	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R3134	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R3135	0103841	CHIP RESISTOR 680 OHM+-5% 0.1W
R3137	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R3138	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R3139	0103842	CHIP RESISTOR 820 OHM+-5% 0.1W
R3140	0103838	RESISTOR CHIP 390 OHM+-5% 0.1W
R3141	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R3142	0103830	CHIP RESISTOR 82 OHM+-5% 0.1W
R3143	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R3144	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R3145	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R3146	0103841	CHIP RESISTOR 680 OHM+-5% 0.1W
R3147	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R3150	0103833	CHIP RESISTOR 150 OHM+-5% 0.1W
R3152	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W

SYMBOL-NO	P-NO	DESCRIPTION
R3153	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R3154	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R3155	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R3156	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R3157	0103858	CHIP RESISTOR 18KOHM+-5% 0.1W
R3158	0103833	CHIP RESISTOR 150 OHM+-5% 0.1W
R3159	0103829	CHIP RESISTOR 68 OHM+-5% 0.1W
R3160	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R3161	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R3162	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R3163	0103829	CHIP RESISTOR 68 OHM+-5% 0.1W
R3164	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R3165	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R3166	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R3167	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R3168	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R3169	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R3170	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R3171	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R3172	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R3174	0103828	CHIP RESISTOR 56 OHM+-5% 0.1W
R3175	0103828	CHIP RESISTOR 56 OHM+-5% 0.1W
R3177	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R3178	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R3181	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R3182	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R3183	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R3184	0103838	RESISTOR CHIP 390 OHM+-5% 0.1W
R3185	0103828	CHIP RESISTOR 56 OHM+-5% 0.1W
R3186	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R3187	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R3188	0103828	CHIP RESISTOR 56 OHM+-5% 0.1W
R3189	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R3201	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R3202	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R3206	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R3207	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R3208	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R3209	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R3210	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R3211	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R3212	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R3217	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R3218	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R3219	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R3222	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R3223	0103838	RESISTOR CHIP 390 OHM+-5% 0.1W
R3224	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R3227	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R3228	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R3229	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R3230	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
R3231	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R3232	0700056	CARBON FILM 15KOHM+-5% 1/8W
R3233	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R3244	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R3245	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R3246	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R3247	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R3252	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R3451	0105124	CHIP RESISTOR 4700 OHM+-1% 1/10W
R3453	0105124	CHIP RESISTOR 4700 OHM+-1% 1/10W
R3457	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W
R3458	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R3459	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W

SYMBOL-NO	P-NO	DESCRIPTION
R3460	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R3461	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R3462	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R3463	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R3464	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R3465	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R3501	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
R3502	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R3503	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R3504	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R3505	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R3506	0103833	CHIP RESISTOR 150 OHM+-5% 0.1W
R3507	0103841	CHIP RESISTOR 680 OHM+-5% 0.1W
R3508	0103841	CHIP RESISTOR 680 OHM+-5% 0.1W
R3509	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R3510	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R3511	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R3512	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R3515	0103836	CHIP RESISTOR 270 OHM+-5% 0.1W
R3516	0103834	CHIP RESISTOR 180 OHM+-5% 0.1W
R3519	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R3521	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W
R3523	0103838	RESISTOR CHIP 390 OHM+-5% 0.1W
R3524	0103833	CHIP RESISTOR 150 OHM+-5% 0.1W
R3525	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R3528	0103833	CHIP RESISTOR 150 OHM+-5% 0.1W
R3551	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R3553	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R3554	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R3555	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R3556	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R3557	0103842	CHIP RESISTOR 820 OHM+-5% 0.1W
R3558	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R3570	0103842	CHIP RESISTOR 820 OHM+-5% 0.1W
R3573	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R3576	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
R3577	0103841	CHIP RESISTOR 680 OHM+-5% 0.1W
R3578	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R3601	0103828	CHIP RESISTOR 56 OHM+-5% 0.1W
R3602	0103828	CHIP RESISTOR 56 OHM+-5% 0.1W
R3604	0103824	CHIP RESISTOR 27 OHM+-5% 0.1W
R3605	0103824	CHIP RESISTOR 27 OHM+-5% 0.1W
R3606	0103828	CHIP RESISTOR 56 OHM+-5% 0.1W
R3607	0103828	CHIP RESISTOR 56 OHM+-5% 0.1W
R3609	0103824	CHIP RESISTOR 27 OHM+-5% 0.1W
R3610	0103824	CHIP RESISTOR 27 OHM+-5% 0.1W
R3612	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W
R3613	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R3614	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W
RT1801	AW10188R	SEMI VARIABLE 22KOHM
RT3501	5030276	VARIABLE RESISTOR 220 OHM
RT3502	5030277	VARIABLE RESISTOR 470 OHM
RT3553	5030083	SEMI VARIABLE 470 OHM

SEMI-CONDUCTORS

D0206	5339141	DIODE 1SS270
D0401	5339141	DIODE 1SS270
D0603	5339231	DIODE 1SR35-100A
D0852	CH10191M	DIODE EG01C-T
D0853	CH10481M	DIODE AG01Z
D0856	CH10481M	DIODE AG01Z
D0857	CH10462S	DIODE S3L20U
D0858	CH10641S	DIODE D3SGM
D0860	5339551	DIODE SS1J4

SYMBOL-NO	P-NO	DESCRIPTION
D0861	5339551	DIODE SS1J4
D0864	CH10191M	DIODE EG01C-T
⚠ D0871	5339233	DIODE 1SR35-400A
⚠ D0872	5339233	DIODE 1SR35-400A
⚠ D0873	5339233	DIODE 1SR35-400A
⚠ D0874	5339233	DIODE 1SR35-400A
D0901	5339551	DIODE SS1J4
D0906	5339141	DIODE 1SS270
D0907	5339141	DIODE 1SS270
D0908	5339141	DIODE 1SS270
D0909	5339141	DIODE 1SS270
D0910	5339231	DIODE 1SR35-100A
D0911	5339231	DIODE 1SR35-100A
D1101	5339141	DIODE 1SS270
D1102	5339141	DIODE 1SS270
D1403	5339141	DIODE 1SS270
D1701	5339141	DIODE 1SS270
D2501	5339141	DIODE 1SS270
D2504	5339141	DIODE 1SS270
D2505	5328308	DIODE MA152WK
D2506	5339141	DIODE 1SS270
D3101	5328308	DIODE MA152WK
D3201	5339041	DIODE 1SS131
D3203	5339141	DIODE 1SS270
D3401	5328308	DIODE MA152WK
IC0201	CK14413U	IC HA118204F
IC0202	CK13571R	IC MSM7470-72MS-KR1
IC0501	CK14421	IC AN3964FB
IC0601	5362045	IC BU4053BCF
IC0851	1360452	IC TL431CLP
IC0901	CK19901	IC HD6473977F-815
IC0902	CP10312R	IC PST9129
IC0903	CP10915	IC ST24C02FB6
IC0904	CP10294	IC XLA6209-V3
IC0905	CP11361R	IC M5278L05
IC1101	CK14481	IC HA118198FP
IC1701	CZ10181	IC BU9716K
IC1801	CS10354	PWB ASSY HTS7337C
IC2101	CJ10212	PHOTO INTERLAPTER SG-236
IC2102	CJ10222	PHOTO INTERLAPTER SG-237
IC2501	CK13501R	IC NJM2533M
IC2561	1350422	IC NJM2246M
IC3101	1366631	IC HA118189MP
IC3201	CS10461	PWB ASSY HTS7431
IC3207	CP10313R	IC PST9145
IC3208	CK19132	IC SC430931PB
IC3209	5305912	IC HD74HC14FP
IC3452	CP11401	IC UPD659AGS
IC3501	CK16591U	IC UPC5022GB-117-2A5
IC3551	1362761	IC BA7048N
IC3601	CK18551R	IC DS36C200MX
IR1701	CJ10261	MODULE PIC-12043TE2 (HEPM)
LD1701	CH10781R	DIODE SLP3117E-51S
LD1702	CH10781R	DIODE SLP3117E-51S
LD1703	CH10781R	DIODE SLP3117E-51S
LD1704	CH10781R	DIODE SLP3117E-51S
LD1705	CH10781R	DIODE SLP3117E-51S
LD1706	5381211	LED SEL-2213C
LD1707	5381214	LED SEL2413E
LD2101	CH10542	DIODE GL451L1
Q0226	5328975	TRANSISTOR 2SC2412K
Q0403	5328975	TRANSISTOR 2SC2412K
Q0405	5328965	TRANSISTOR 2SA1037K
Q0406	5323172	TRANSISTOR 2SC1214CD
Q0410	CA10733R	TRANSISTOR DTC144K (HEPM)
Q0411	5328965	TRANSISTOR 2SA1037K
Q0412	5328975	TRANSISTOR 2SC2412K
Q0413	5328975	TRANSISTOR 2SC2412K
Q0451	5328975	TRANSISTOR 2SC2412K
Q0502	5328975	TRANSISTOR 2SC2412K
Q0851	CF10622	TRANSISTOR FS3KM-10TO-220
Q0852	CF10451R	TRANSISTOR 2SC3246
Q0853	CF10311	TRANSISTOR 2SD2398
Q0854	5327262	TRANSISTOR 2SB1326
Q0855	5328975	TRANSISTOR 2SC2412K
Q0858	5327131	TRANSISTOR 2SB562C
Q0859	5328975	TRANSISTOR 2SC2412K
Q0864	CF10311	TRANSISTOR 2SD2398
Q0905	5328965	TRANSISTOR 2SA1037K
Q0906	5328965	TRANSISTOR 2SA1037K
Q0911	5328965	TRANSISTOR 2SA1037K
Q0912	CA10733R	TRANSISTOR DTC144K (HEPM)
Q0913	5328975	TRANSISTOR 2SC2412K
Q0914	CA10733R	TRANSISTOR DTC144K (HEPM)
Q0931	CA10733R	TRANSISTOR DTC144K (HEPM)
Q0932	CA10733R	TRANSISTOR DTC144K (HEPM)
Q1101	5328975	TRANSISTOR 2SC2412K
Q1102	5328965	TRANSISTOR 2SA1037K
Q1151	CA10733R	TRANSISTOR DTC144K (HEPM)
Q1401	5328975	TRANSISTOR 2SC2412K
Q1404	5328965	TRANSISTOR 2SA1037K
Q1407	5328965	TRANSISTOR 2SA1037K
Q1409	5328975	TRANSISTOR 2SC2412K
Q1410	5328965	TRANSISTOR 2SA1037K
Q1411	5328975	TRANSISTOR 2SC2412K
Q1412	5328975	TRANSISTOR 2SC2412K
Q1702	5327063	TRANSISTOR 2SC1740S
Q1703	5327071	TRANSISTOR DTC124ES
Q1704	5327071	TRANSISTOR DTC124ES
Q1705	5327071	TRANSISTOR DTC124ES
Q1802	CA10733R	TRANSISTOR DTC144K (HEPM)
Q2101	CF10372	TRANSISTOR PT493FL1
Q2102	CF10372	TRANSISTOR PT493FL1
Q2103	CA10733R	TRANSISTOR DTC144K (HEPM)
Q2104	CA10733R	TRANSISTOR DTC144K (HEPM)
Q2501	5328975	TRANSISTOR 2SC2412K
Q2502	5328975	TRANSISTOR 2SC2412K
Q2503	5328975	TRANSISTOR 2SC2412K
Q2504	CA10733R	TRANSISTOR DTC144K (HEPM)
Q2505	5328975	TRANSISTOR 2SC2412K
Q2506	CA10733R	TRANSISTOR DTC144K (HEPM)
Q2507	1320011	TRANSISTOR 2SA933S(Q)
Q2508	CA10733R	TRANSISTOR DTC144K (HEPM)
Q2509	CA10735R	TRANSISTOR DTA144EK
Q2551	CA10733R	TRANSISTOR DTC144K (HEPM)
Q2552	5327131	TRANSISTOR 2SB562C
Q2553	CA10733R	TRANSISTOR DTC144K (HEPM)
Q2554	5327021	TRANSISTOR 2SA844CD
Q2555	CA10733R	TRANSISTOR DTC144K (HEPM)
Q2556	CA10733R	TRANSISTOR DTC144K (HEPM)
Q2557	CA10733R	TRANSISTOR DTC144K (HEPM)
Q2558	CA10733R	TRANSISTOR DTC144K (HEPM)
Q2559	CA10733R	TRANSISTOR DTC144K (HEPM)
Q3113	5328975	TRANSISTOR 2SC2412K
Q3117	5328975	TRANSISTOR 2SC2412K
Q3118	5328975	TRANSISTOR 2SC2412K
Q3120	5328965	TRANSISTOR 2SA1037K
Q3121	5328975	TRANSISTOR 2SC2412K
Q3122	CF10761R	TRANSISTOR 2SC3337
Q3123	5328965	TRANSISTOR 2SA1037K

SYMBOL-NO	P-NO	DESCRIPTION
Q3124	CA10733R	TRANSISTOR DTC144K (HEPM)
Q3125	5328965	TRANSISTOR 2SA1037K
Q3126	CA10733R	TRANSISTOR DTC144K (HEPM)
Q3127	5328965	TRANSISTOR 2SA1037K
Q3128	5328975	TRANSISTOR 2SC2412K
Q3129	5328221	TRANSISTOR 2SC2620-QC
Q3130	5328221	TRANSISTOR 2SC2620-QC
Q3131	5328975	TRANSISTOR 2SC2412K
Q3132	CF10761R	TRANSISTOR 2SC3337
Q3133	CA10733R	TRANSISTOR DTC144K (HEPM)
Q3134	5328975	TRANSISTOR 2SC2412K
Q3204	CA10731R	TRANSISTOR DTC124K
Q3207	5327262	TRANSISTOR 2SB1326
Q3208	CA10731R	TRANSISTOR DTC124K
Q3209	CA10735R	TRANSISTOR DTA144EK
Q3211	5328965	TRANSISTOR 2SA1037K
Q3212	CA10733R	TRANSISTOR DTC144K (HEPM)
Q3213	5328241	TRANSISTOR 2SC2463E(DE)
Q3214	CF10781R	TRANSISTOR 2SA1560-QR
Q3451	CA10733R	TRANSISTOR DTC144K (HEPM)
Q3555	5328221	TRANSISTOR 2SC2620-QC
Q3556	5328221	TRANSISTOR 2SC2620-QC
TH3501	CE10111R	THERMISTOR NTH5G42B10
⚠ PC0851	5327593	PHOTO COUPLER PS2501-1
⚠ QF0851	5721945	IC PROTECTOR, ICP-N38
⚠ QF0852	5721946	PROTECTOR, ICP-N15
⚠ QF3201	5721946	PROTECTOR, ICP-N15
ZD0851	5339251	DIODE HZS2-C3
ZD0861	5336811	DIODE MA2180A
ZD0862	5339268	DIODE HZS11B2
ZD0864	5339482	DIODE HZS15-2
ZD0901	5339275	DIODE HZS7-B2
ZD0904	5339297	DIODE HZS5C3
ZD2501	5339406	DIODE UTZJ30C
ZD2502	5339296	DIODE HZS5B2
ZD3202	5339296	DIODE HZS5B2

TRANSFORMERS

T0401	BT10251	TRANSFORMER, POWER
⚠ T0851	BT10341	TRANSFORMER, POWER

COILS

L0202	0770057	CHOKE COIL 100UH+-5%
L0203	5121288	COIL 15UH
L0204	5121287	COIL 10UH
L0205	0770057	CHOKE COIL 100UH+-5%
L0206	5121569	COIL 82UH
L0208	0770057	CHOKE COIL 100UH+-5%
L0209	5159142	CHOKE COIL 12UH
L0210	5159146	CHOKE COIL 27UH
L0401	5159114	COIL 15MH
L0403	0770057	CHOKE COIL 100UH+-5%
L0501	0770048	CHOKE COIL 22UH+-5%
L0502	0770057	CHOKE COIL 100UH+-5%
L0503	5159158	CHOKE COIL 220UH
⚠ L0851	5220242	COIL 18MH
L0853	BH00201R	COIL 10UH
L0854	BH00205R	COIL 22UH
L1102	5121294	COIL 100UH
L1103	5121611	COIL 100UH
L1106	5159155	CHOKE COIL 120UH+-10%
L1402	5121288	COIL 15UH
L1403	5121284	COIL 3.3UH
L1406	0770057	CHOKE COIL 100UH+-5%
L1701	0770057	CHOKE COIL 100UH+-5%
L1801	0770057	CHOKE COIL 100UH+-5%
L2502	5121611	COIL 100UH
L2504	5121611	COIL 100UH
L2505	5121611	COIL 100UH
L2506	5121611	COIL 100UH
L2561	5121611	COIL 100UH
L3101	0770057	CHOKE COIL 100UH+-5%
L3102	0770057	CHOKE COIL 100UH+-5%
L3103	0770057	CHOKE COIL 100UH+-5%
L3201	0770044	CHOKE COIL 10UH+-5%
L3205	5121611	COIL 100UH
L3451	5121611	COIL 100UH
L3452	5121611	COIL 100UH
L3453	5121611	COIL 100UH
L3454	0770034	COIL 1.8UH
L3501	5121611	COIL 100UH
L3502	5121611	COIL 100UH
L3503	5121611	COIL 100UH
L3504	0770035	COIL 2.2UH
L3505	0770037	COIL 3.3UH
L3506	0770034	COIL 1.8UH
L3510	5121611	COIL 100UH
L3551	5121611	COIL 100UH
L3552	5121611	COIL 100UH
L3601	5121611	COIL 100UH

CRYSTALS

X0201	BP10531	CRYSTAL
X0901	BP10571	CRYSTAL
X0902	BP10251	CRYSTAL
X3201	BP10671	CRYSTAL
X3202	BP10681	CRYSTAL
X3203	BP10691	CRYSTAL
X3204	BP10381R	CRYSTAL

MISCELLANEOUS

BC3203	0209781	CERAMIC CHIP 0.022UF+80-20% 16V
BC3204	0209784	CORE
BC3205	0209784	CORE
BC3206	0209781	CERAMIC CHIP 0.022UF+80-20% 16V
BC3207	0209782	CERAMIC CHIP 100PF+-20% 100V
BC3208	0209781	CERAMIC CHIP 0.022UF+80-20% 16V
BC3209	0209782	CERAMIC CHIP 100PF+-20% 100V
BL0851	5272378	LC FILTER
BL0853	5272378	LC FILTER
BL0855	5272378	LC FILTER
BL0857	5272378	LC FILTER
BL0901	5272379	COIL
BL0902	5274521	CORE, FERRITE
BL3201	5272379	COIL
BL3202	5272379	COIL
BL3203	5172542	FILTER
BL3204	5172542	FILTER
BL3206	5172542	FILTER
BL3207	5172542	FILTER
BL3208	5172544	CORE
BL3209	5172544	CORE
BL3214	5172541	FILTER
BL3215	5172541	FILTER
BL3216	5272379	COIL
BL3217	5272379	COIL

SYMBOL-NO	P-NO	DESCRIPTION
CP3101	BJ10231	FILTER, LC
CP3102	BJ10231	FILTER, LC
CP3103	BJ10231	FILTER, LC
CP3104	BJ10231	FILTER, LC
⚠F0851	FN10201	FUSE 003A
⚠FE2501	5582216	TUNER IF UNIT
⚠FH0851	5722411	HOLDER, FUSE
⚠FH0852	5722411	HOLDER, FUSE
JK2501	ES10441	JACK
JK2503	E010162	JACK
JK4501	EY10481	SOCKET
LCD1701	DB10371	DISPLAY, LIQUID CRYSTAL (HEPM)
LMP1701	5763357	LAMP
LMP1702	5763357	LAMP
LMP1703	5763357	LAMP
LMP1704	5763357	LAMP
S1714	5634884	SWITCH
S1715	5634884	SWITCH
S1719	FE10211R	SWITCH
S1720	FE10211R	SWITCH
S2101	FD10211	SWITCH, MODE
S2102	5635631	SWITCH
S2103	5635631	SWITCH
S2104	5635631	SWITCH
S2701	5634884	SWITCH
S2704	5634884	SWITCH
S2707	5634884	SWITCH
S2708	5634884	SWITCH
S2709	5634884	SWITCH
S2721	FH10271	SWITCH

CHAPTER 6 SCHEMATIC, CIRCUIT BOARD AND BLOCK DIAGRAMS

Cautions when using schematic diagrams

Caution for safety

The parts marked ⚠ are critical for safety. Be sure to use the specified parts to ensure safety when replacing them.

1. Values in schematic diagrams

The values, dielectric strength (power capacitance) and tolerances of the resistors (excluding variable resistors) and capacitors are indicated in the schematic diagrams using abbreviations.

[Resistors]

Item	Indication
Value	No indication ..... Ω K ..... k Ω M ..... M Ω
Tolerance	No indication ..... ±5% (All tolerances other than ± 5% are indicated in the schematic diagrams)
Power capacitance	No indication ..... 1/8W (1/16W for leadless resistors without indication) All capacitances other than the above are indicated in the schematic diagrams.

[Capacitors]

Item	Indication
Value	No indication ..... μF P ..... pF
Dielectric strength	No indication ..... 50V (All dielectric strengths other than 50V are indicated in the schematic diagrams.)

[Coils]

Item	Indication
Value	μ ..... μH m ..... mH

Cautions when using circuit board diagrams

1. Identifications of sides A/B in circuit board diagrams

1) Board having a pattern on one side and parts on both sides.
   - Side A: Shows discrete parts, viewed from the pattern side.
   - Side B: Shows leadless parts, viewed from the pattern side.

2) Board having patterns on both sides and parts on both sides.
   - Side A: Shows parts and patterns which can be seen when the case is opened.
   - Side B: Shows parts and the pattern on the back of side A.

2. Table for indexing locations of parts

This table shows locations of each part on the circuit board diagrams. The locations are indicated using the guide scales on the external lines of diagrams.

1) In case of one-layer board

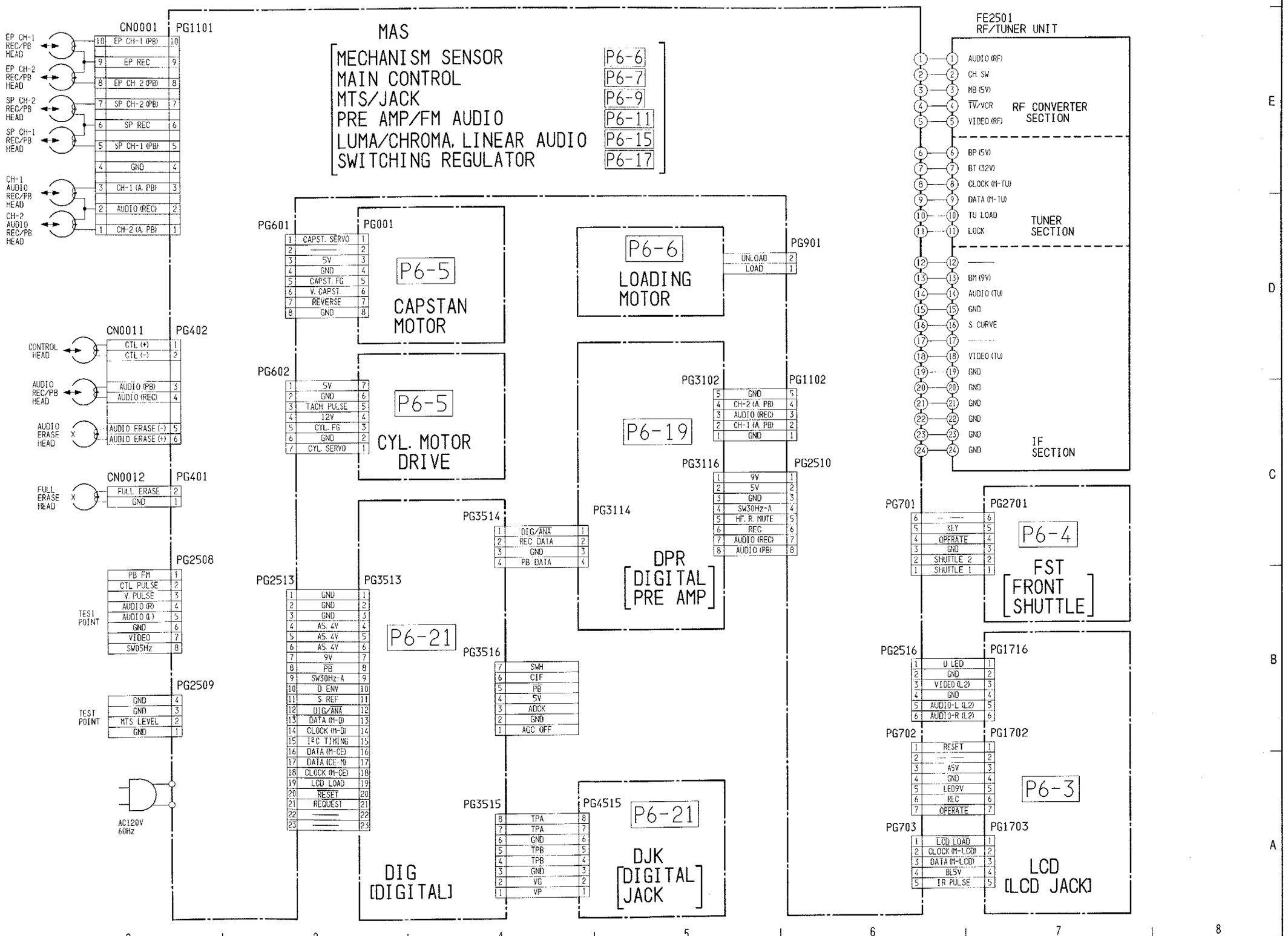
Symbol No.	Part Location
I C	
IC2101	2 A

- I C — Sort of parts
- 2 — Zone "2" on board diagram
- A — Zone "A" on board diagram
- IC2101 — Circuit No.

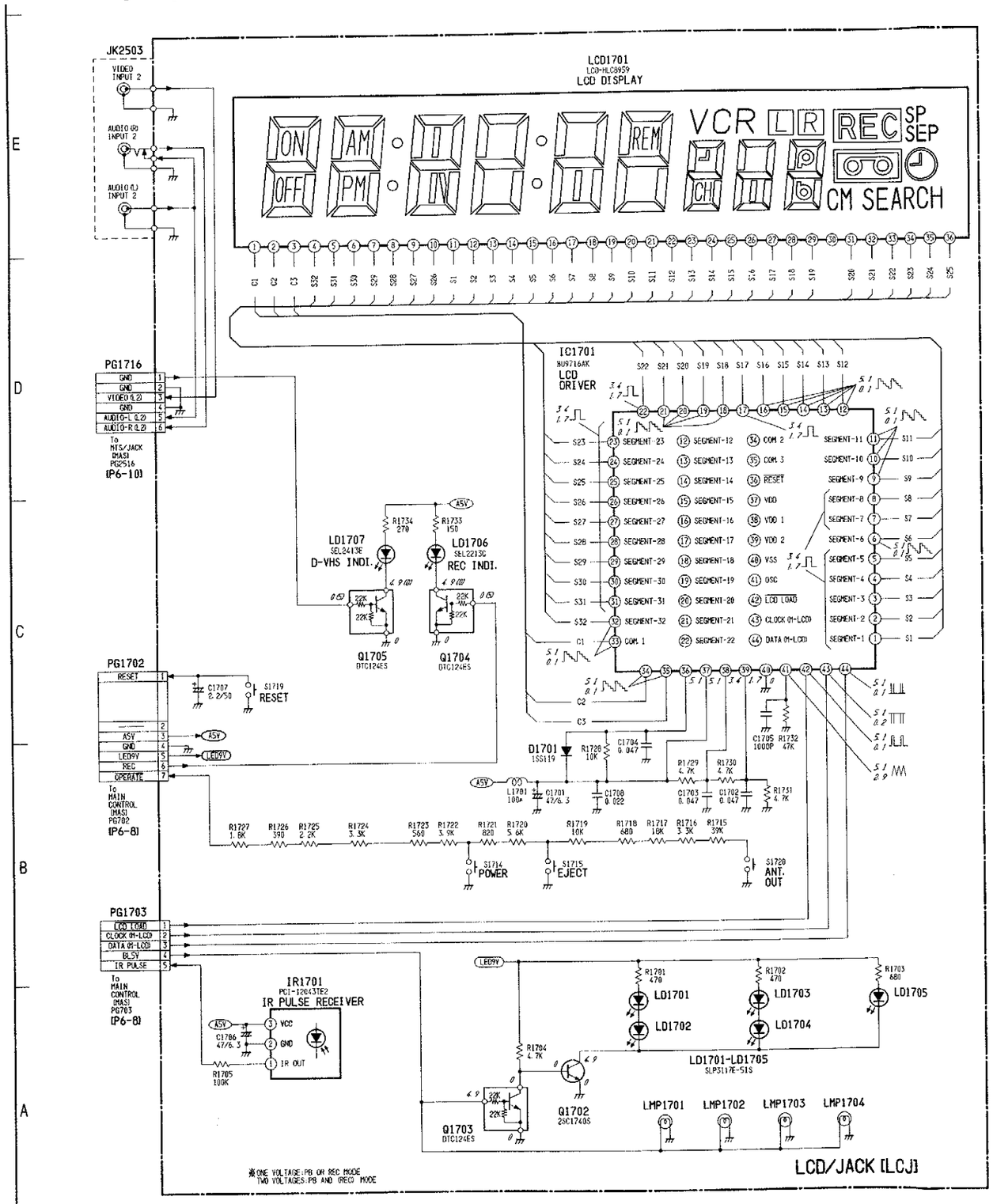
2) In case of side A/B indication board

Symbol No.	Part Location
Q	
Q1201	A — 2 A

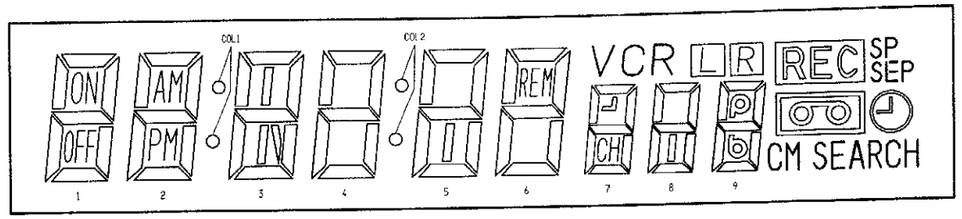
- Q — Sort of parts
- 2 — Zone "2" on board diagram
- A — Zone "A" on board diagram
- Q1201 — Circuit No.
- A — A: Shows side A, B: Shows side B


MAS
MECHANISM SENSOR P6-6
MAIN CONTROL P6-7
MTS/JACK P6-9
PRE AMP/FM AUDIO P6-11
LUMA/CHROMA, LINEAR AUDIO P6-15
SWITCHING REGULATOR P6-17
CN0001
PG1101
EP CH-1 REC/PB HEAD
EP CH-2 REC/PB HEAD
SP CH-2 REC/PB HEAD
SP CH-1 REC/PB HEAD
CH-1 AUDIO REC/PB HEAD
CH-2 AUDIO REC/PB HEAD
EP CH-1 (PB)
EP REC
EP CH-2 (PB)
SP CH-2 (PB)
SP REC
SP CH-1 (PB)
GND
CH-1 (A. PB)
AUDIO (REC)
CH-2 (A. PB)
CN0011
PG402
CONTROL HEAD
AUDIO REC/PB HEAD
AUDIO ERASE HEAD
CTL (+)
CTL (-)
AUDIO (PB)
AUDIO (REC)
AUDIO ERASE (-)
AUDIO ERASE (+)
CN0012
PG401
FULL ERASE HEAD
FULL ERASE
GND
PG2508
TEST POINT
PB FM
CTL PULSE
V. PULSE
AUDIO (R)
AUDIO (L)
GND
VIDEO
SW05Hz
PG2509
TEST POINT
GND
GND
MTS LEVEL
GND
AC120V 60Hz
PG601
PG001
P6-5
CAPSTAN MOTOR
CAPST. SERVO
5V
GND
CAPST. FG
V. CAPST.
REVERSE
GND
PG602
P6-5
CYL. MOTOR DRIVE
5V
GND
TACH PULSE
12V
CYL. FG
GND
CYL. SERVO
PG2513
PG3513
P6-21
DIG [DIGITAL]
GND
GND
GND
A5. 4V
A5. 4V
A5. 4V
9V
PB
SW30Hz-A
D ENV
S REF
DIG/ANA
DATA (M-D)
CLOCK (M-D)
I²C TIMING
DATA (M-CE)
DATA (CE-M)
CLOCK (M-CE)
LCD LOAD
RESET
REQUEST
PG3514
DIG/ANA
REC DATA
GND
PB DATA
PG3516
SWH
CIF
PB
5V
ADCK
GND
AGC OFF
PG3515
PG4515
P6-21
DJK [DIGITAL JACK]
TPA
TPA
GND
TPB
TPB
GND
VG
VP
P6-6
LOADING MOTOR
PG901
UNLOAD
LOAD
P6-19
PG3102
PG1102
GND
CH-2 (A. PB)
AUDIO (REC)
CH-1 (A. PB)
GND
PG3116
PG2510
9V
5V
GND
SW30Hz-A
HF. R. MUTE
REC
AUDIO (REC)
AUDIO (PB)
PG3114
DPR [DIGITAL PRE AMP]
FE2501
RF/TUNER UNIT
AUDIO (RF)
CH SW
MB (5V)
TV/VCR
VIDEO (RF)
RF CONVERTER SECTION
BP (5V)
BT (32V)
CLOCK (M-TU)
DATA (M-TU)
TU LOAD
LOCK
TUNER SECTION
BM (9V)
AUDIO (TU)
GND
S. CURVE
VIDEO (TU)
GND
GND
GND
GND
GND
IF SECTION
PG701
PG2701
P6-4
FST [FRONT SHUTTLE]
KEY
OPERATE
GND
SHUTTLE 2
SHUTTLE 1
PG2516
PG1716
D LED
GND
VIDEO (L2)
GND
AUDIO-L (L2)
AUDIO-R (L2)
PG702
PG1702
P6-3
RESET
A5V
GND
LED9V
REC
OPERATE
PG703
PG1703
LCD [LCD JACK]
LCD LOAD
CLOCK (M-LCD)
DATA (M-LCD)
BL5V
IR PULSE
1
2
3
4
5
6
7
8
A
B
C
D
E

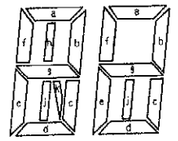
LCJ/JACK [LCJ] SCHEMATIC DIAGRAM



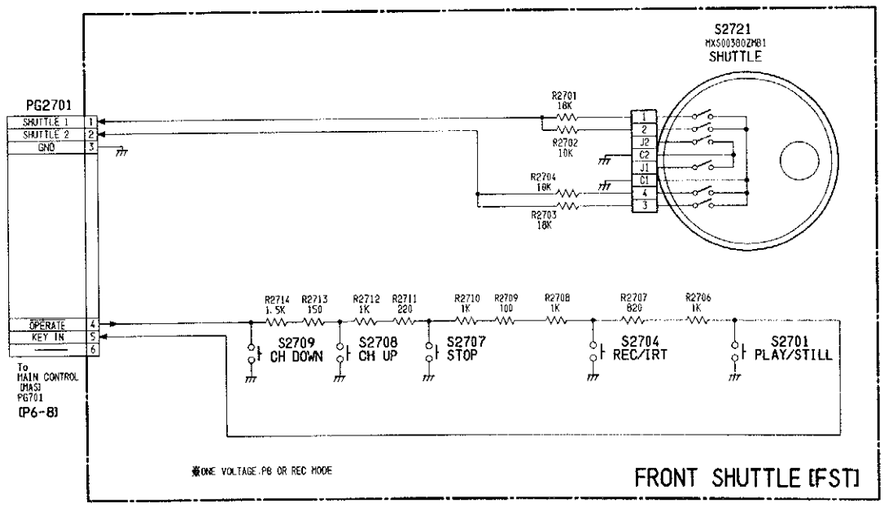
LCD GRID TABLE



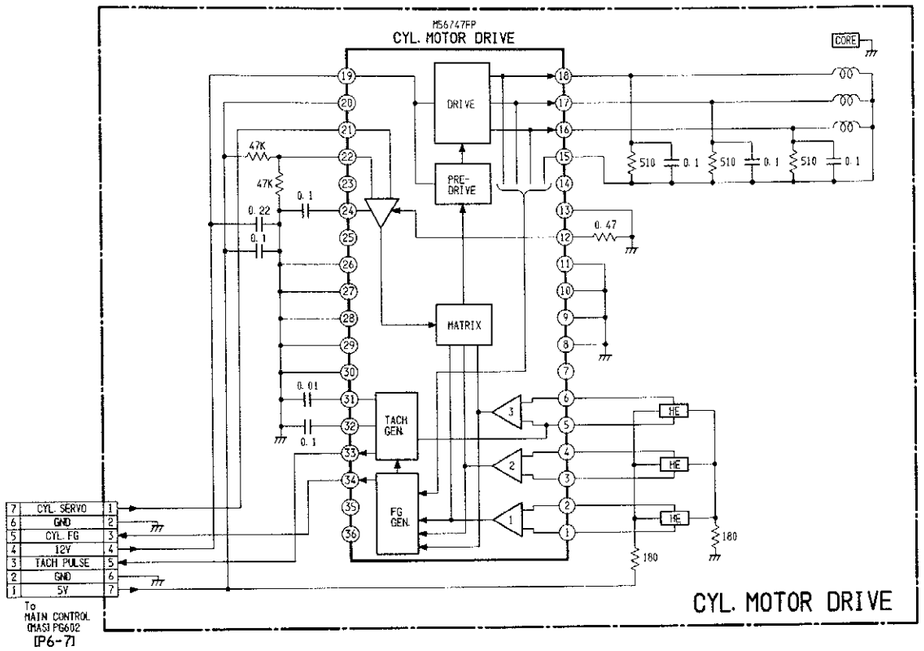
PIN No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
COM1	COM1	—	—	1adef	OFF	2d	PM	2c	3e	3g	3d	3c	4e	4d	5e	5i	5d	6e
COM2	—	COM2	—	1g	1bc	2e	2g	2b	3f	3hi	3k	3b	4g	4c	5f	5g	5c	6f
COM3	—	—	COM3	ON	2a	2f	AM	COL1	—	3a	—	4f	4a	4b	COL2	5a	5b	6a
PIN No.	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
COM1	6d	6c	7d	CH	7c	8d	8i	8c	9d	9g	9c		—	SP	S	—	—	
COM2	6g	6b	7e	7g	7b	8e	8g	8b	9e	D b	9b	N.C	▭	—	LP	◷	CM SEARCH	N.C
COM3	REM	VCR	7f	◿	7a	8f	8a	L	9f	9a	R		REC	—	-	—	—	



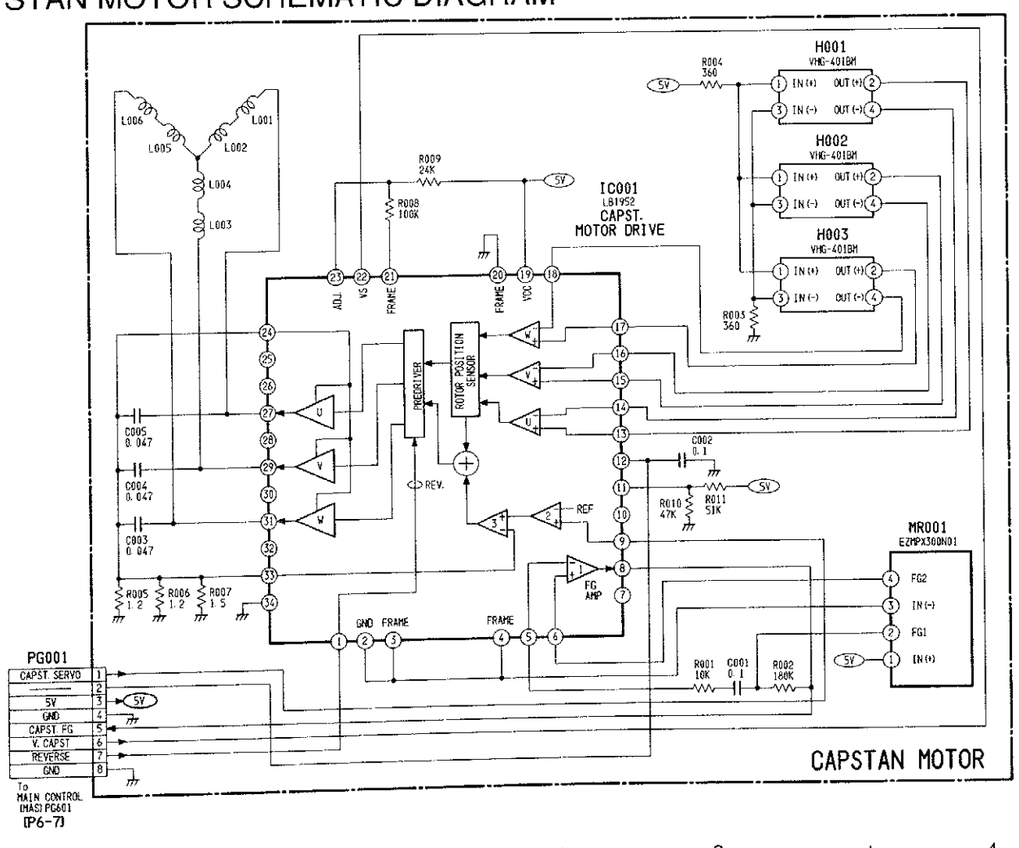
FRONT SHUTTLE [FST] SCHEMATIC DIAGRAM



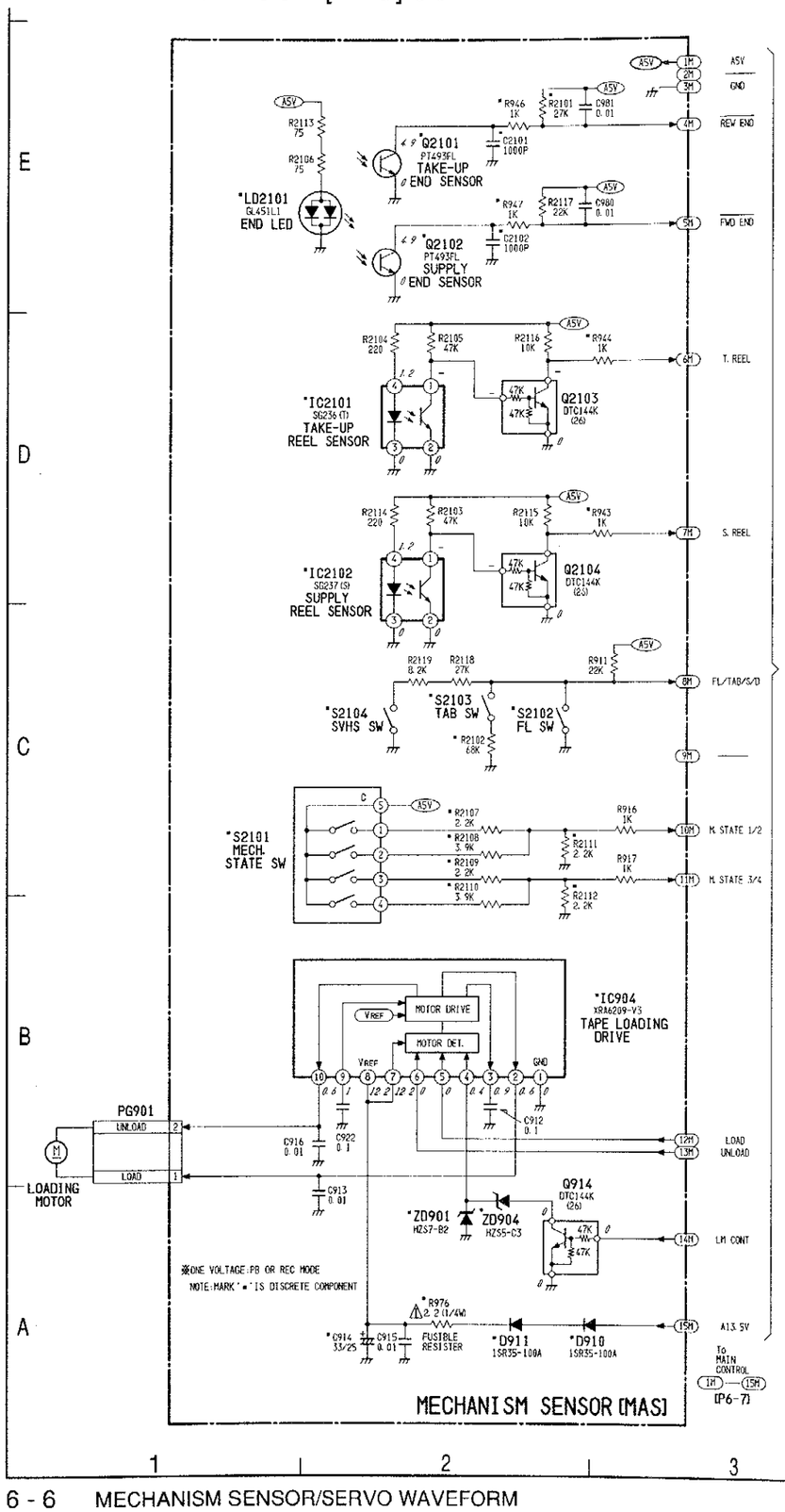
CYL MOTOR SCHEMATIC DIAGRAM



CAPSTAN MOTOR SCHEMATIC DIAGRAM



MECHANISM SENSOR [MAS] SCHEMATIC DIAGRAM

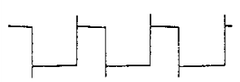


SERVO WAVEFORMS

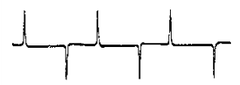
1-A IC901-24 5.6Vp-p
2V/5.0msec. cm
REC/PLAY

2-A IC901-31 5.7Vp-p
2V/10.0msec. cm
REC

3-A IC901-32 5.7Vp-p
2V/10.0msec. cm
REC

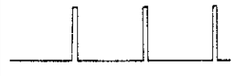


4-B IC901-37 3.2Vp-p
1V/10.0msec. cm
PLAY

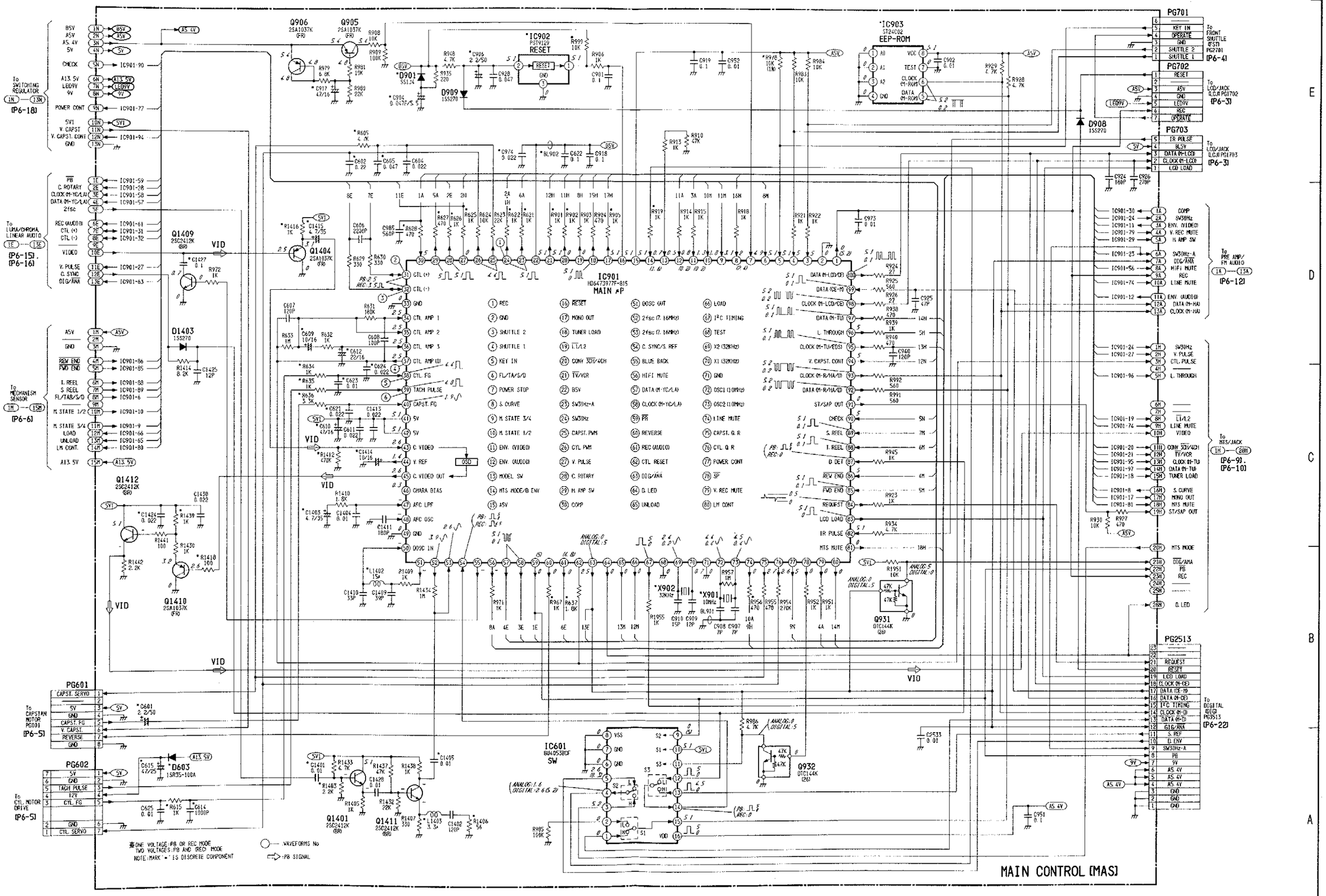


5-A IC901-38 4.6Vp-p
2V/500 μ sec. cm
REC/PLAY

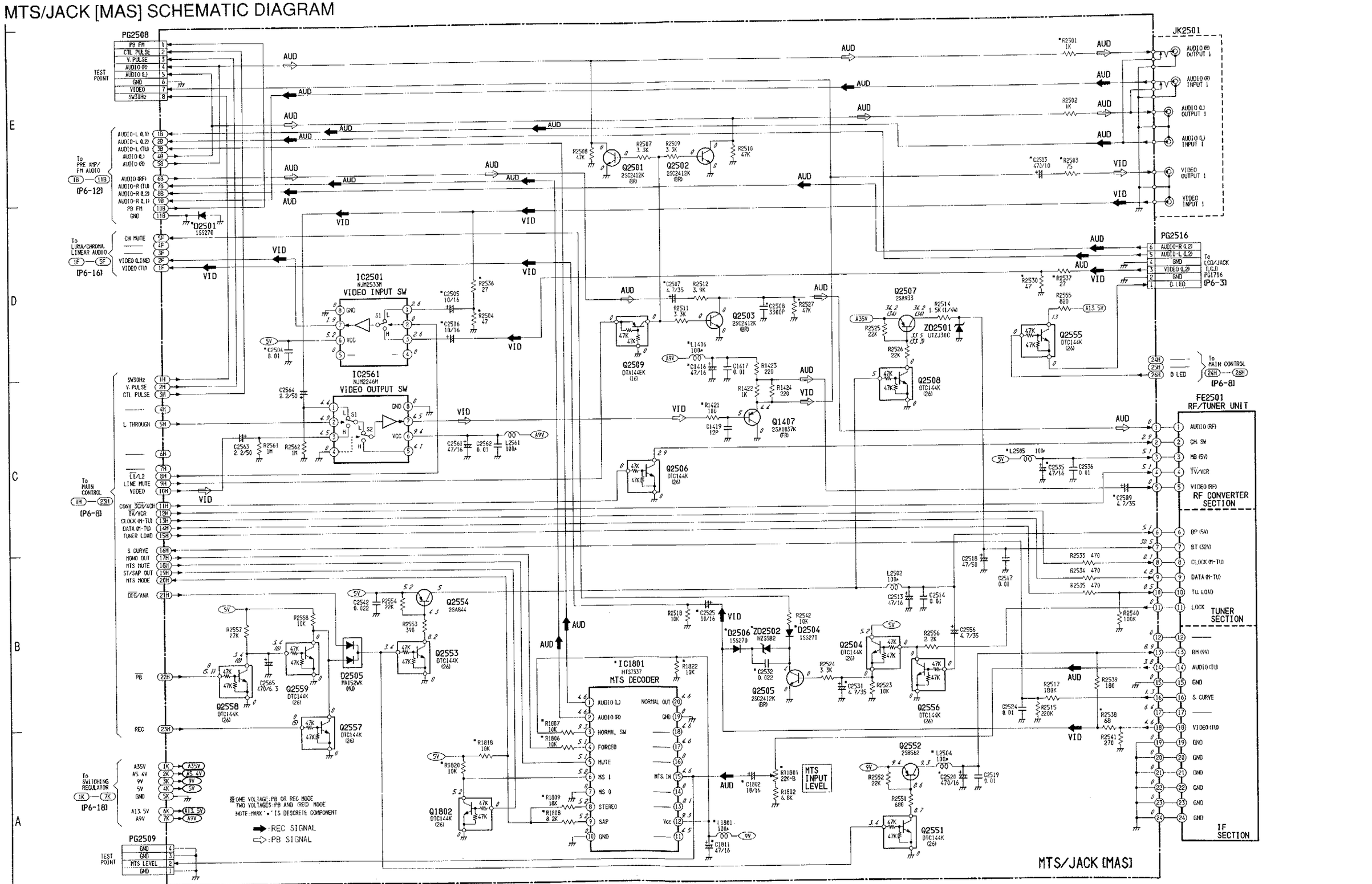
6-A IC901-39 4.8Vp-p
2V/10.0msec. cm
REC/PLAY



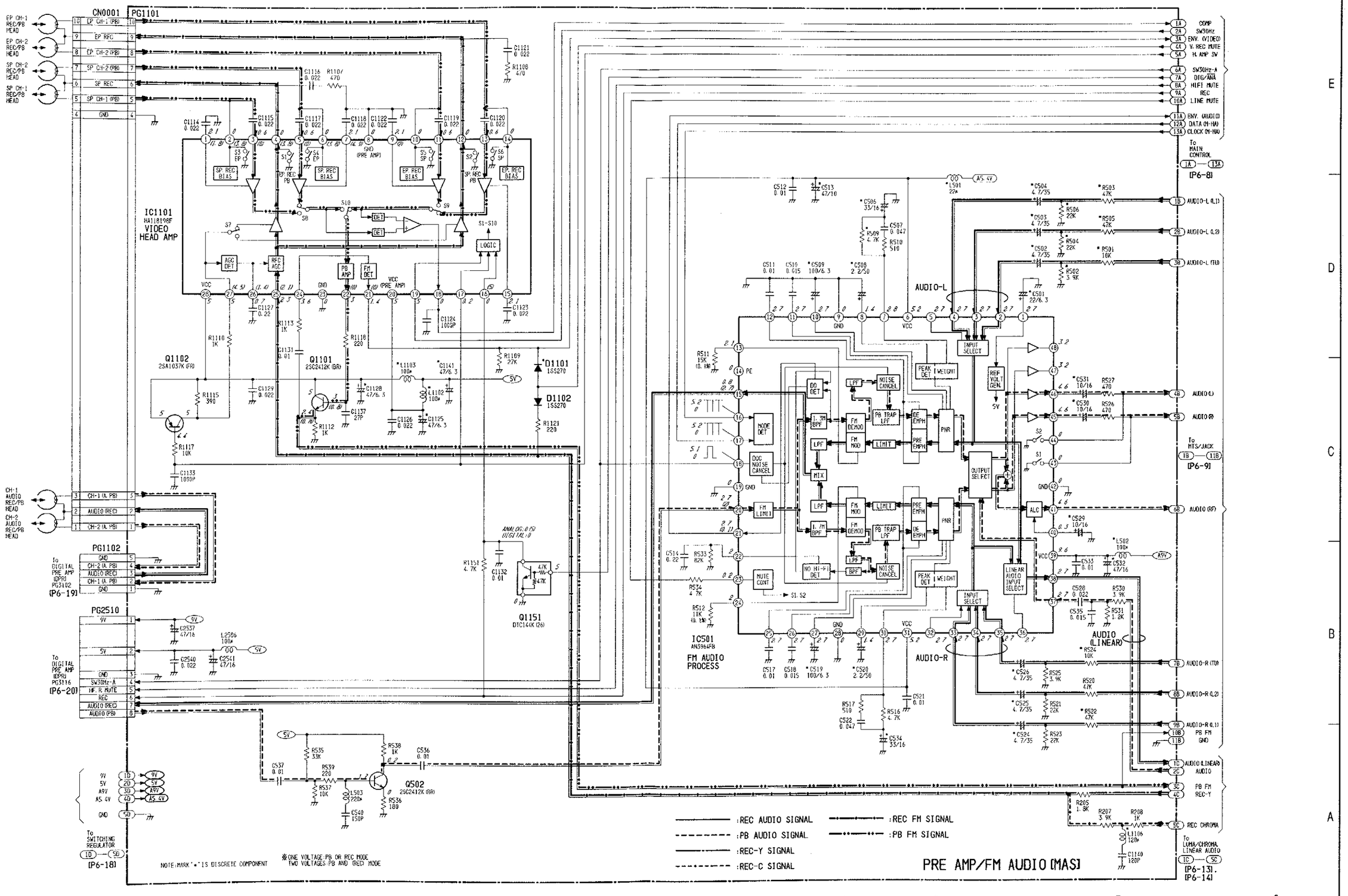
MAIN CONTROL [MAS] SCHEMATIC DIAGRAM



MTS/JACK [MAS] SCHEMATIC DIAGRAM



PRE AMP/FM AUDIO [MAS] SCHEMATIC DIAGRAM

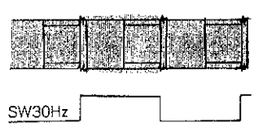
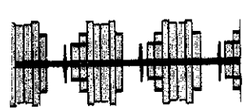
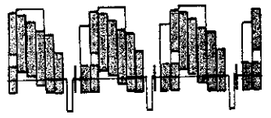
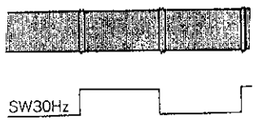
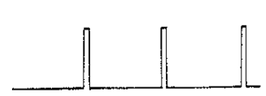
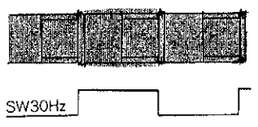
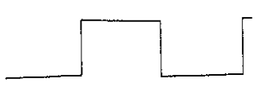
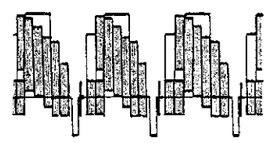
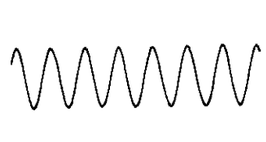
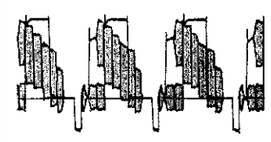


NOTE: MARK "*" IS DISCRETE COMPONENT

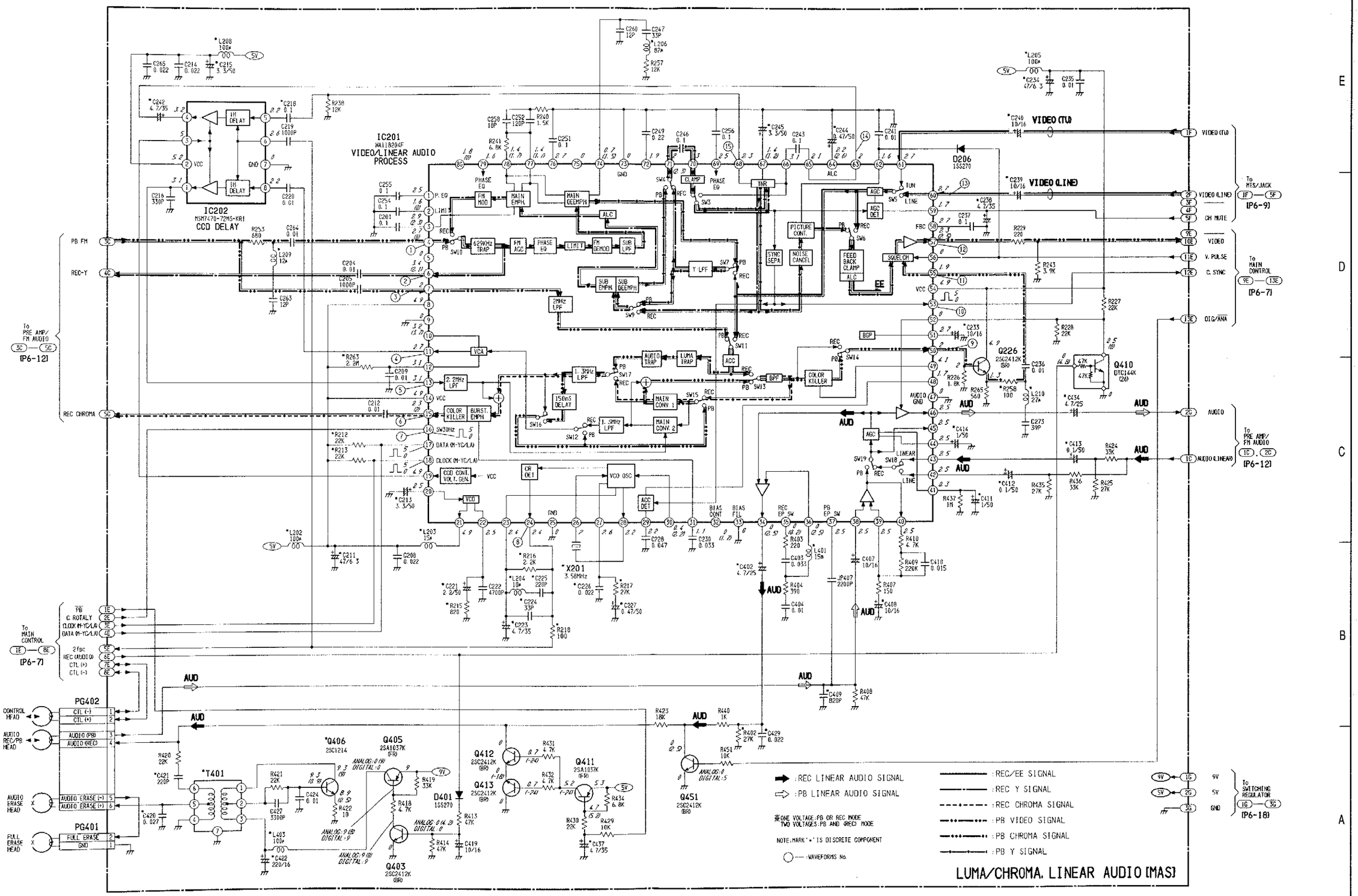
※ONE VOLTAGE: PB OR REC MODE
TWO VOLTAGES: PB AND (REC) MODE

MEMO

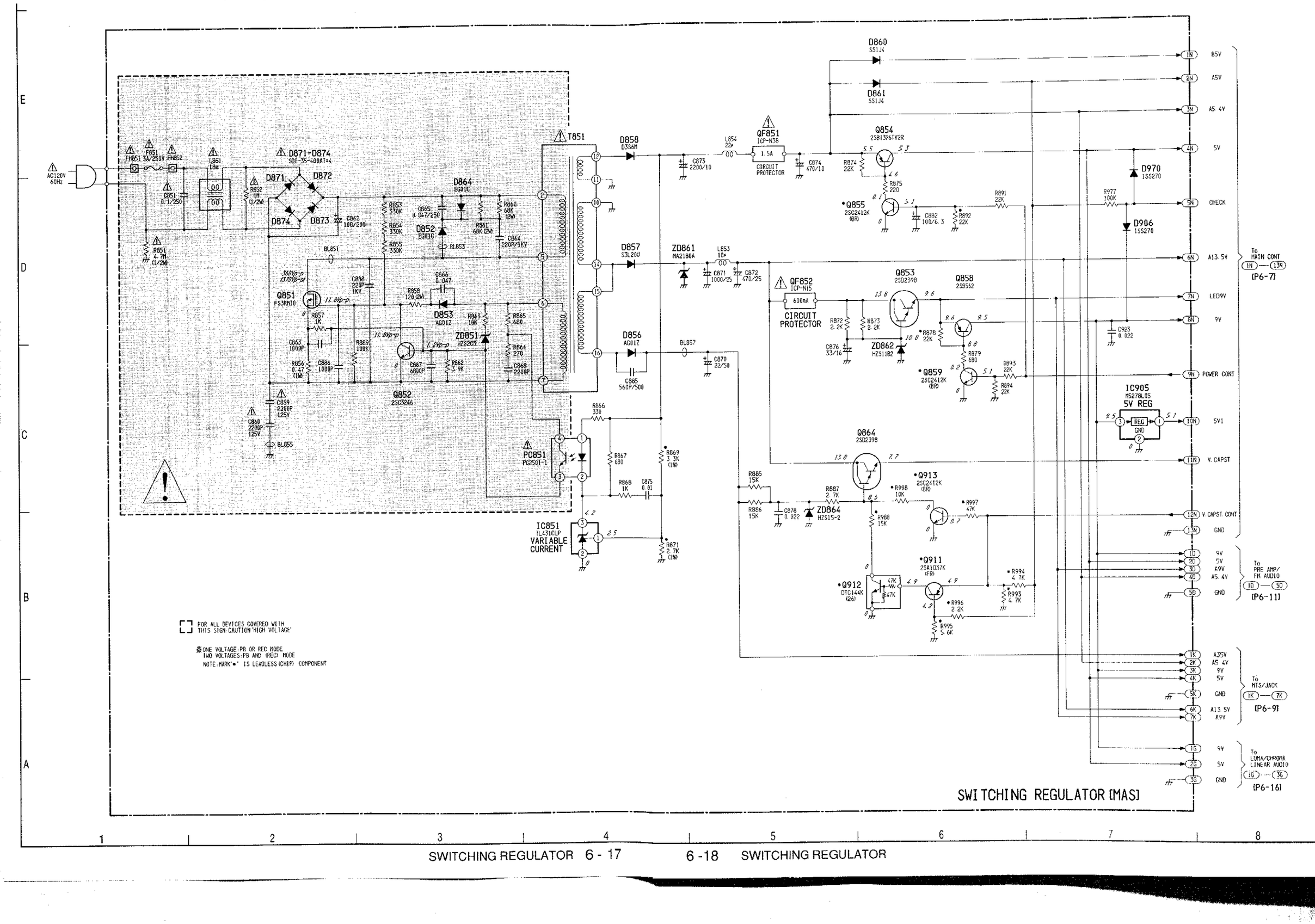
Y/CHROMA WAVEFORMS

1-B IC201-4 550mVp-p 0.2V/5.0msec. cm PLAY	5-A IC201-13 530mVp-p 0.2V/20.0 μ sec. cm REC	9-B IC201-50 540mVp-p 0.2V/20.0 μ sec. cm PLAY	13-A IC201-60 1.4Vp-p 0.5V/20.0 μ sec. cm REC
			
2-A IC201-6 380mVp-p 0.2V/5.0msec. cm REC	5-B IC201-13 640mVp-p 0.2V/20.0 μ sec. cm PLAY	10-A IC201-53 5.0Vp-p 2V/20.0 μ sec. cm REC/PLAY	14-A IC201-63 680mVp-p 0.2V/20.0 μ sec. cm REC
			
3-B IC201-7 650mVp-p 0.2V/5.0msec. cm PLAY	6-A IC201-15 400mVp-p 0.1V/20.0 μ sec. cm REC	11-B IC201-55 500mVp-p 0.1V/20.0 μ sec. cm PLAY	14-B IC201-63 680mVp-p 0.2V/20.0 μ sec. cm PLAY
			
4-A IC201-11 330mVp-p 0.1V/20.0 μ sec. cm REC	7-A IC201-16 5.7Vp-p 2V/5.0msec. cm REC/PLAY	12-A IC201-57 2.1Vp-p 0.5V/20.0 μ sec. cm REC	15-A IC201-68 430mVp-p 0.2V/20.0 μ sec. cm REC
			
4-B IC201-11 420mVp-p 0.1V/20.0 μ sec. cm PLAY	8-A IC201-24 510mVp-p 0.2V/100nsec. cm REC/PLAY	12-B IC201-57 2.2Vp-p 0.5V/20.0 μ sec. cm PLAY	15-B IC201-68 430mVp-p 0.2V/20.0 μ sec. cm PLAY
			

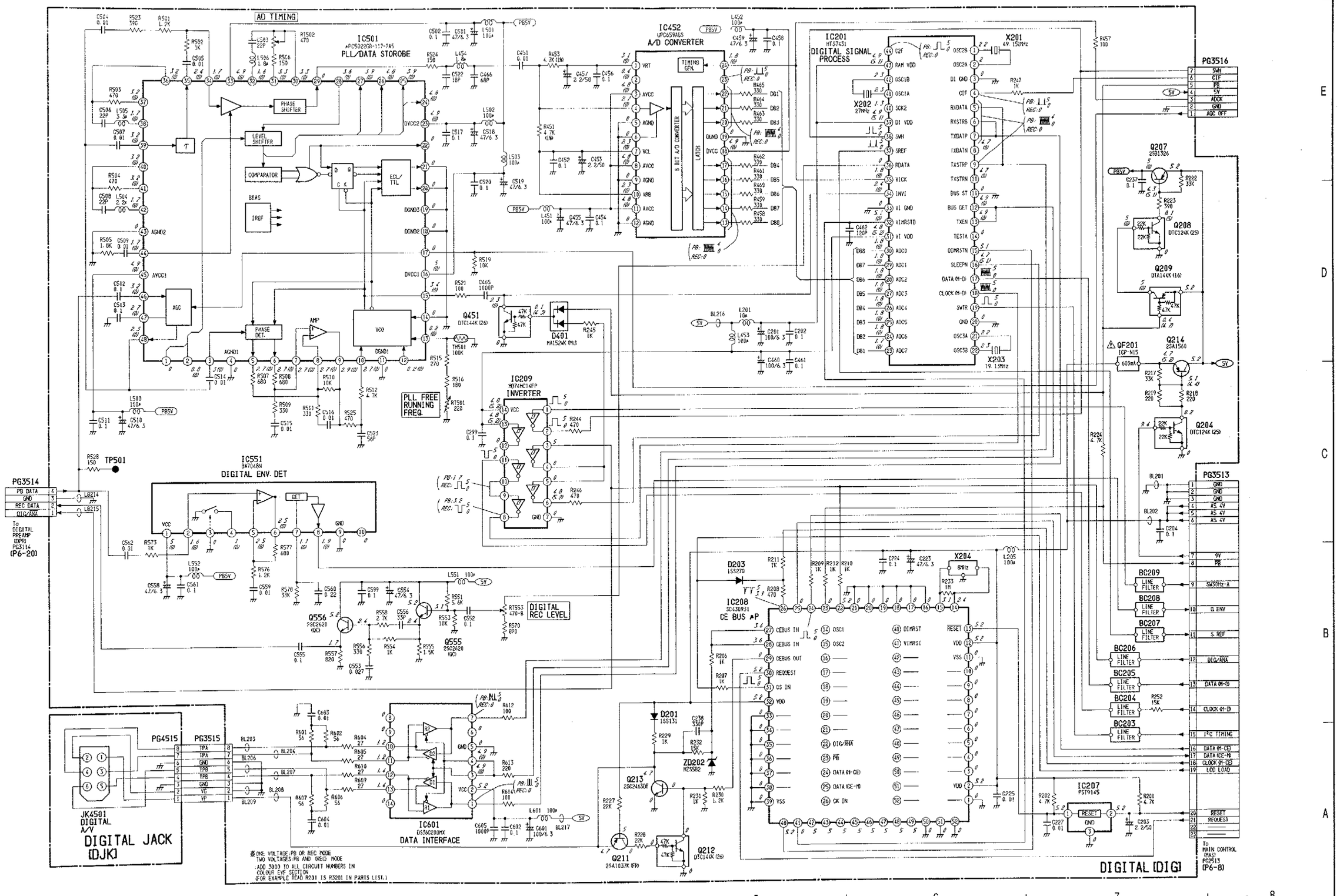
Y/CHROMA AUDIO [MAS] SCHEMATIC DIAGRAM



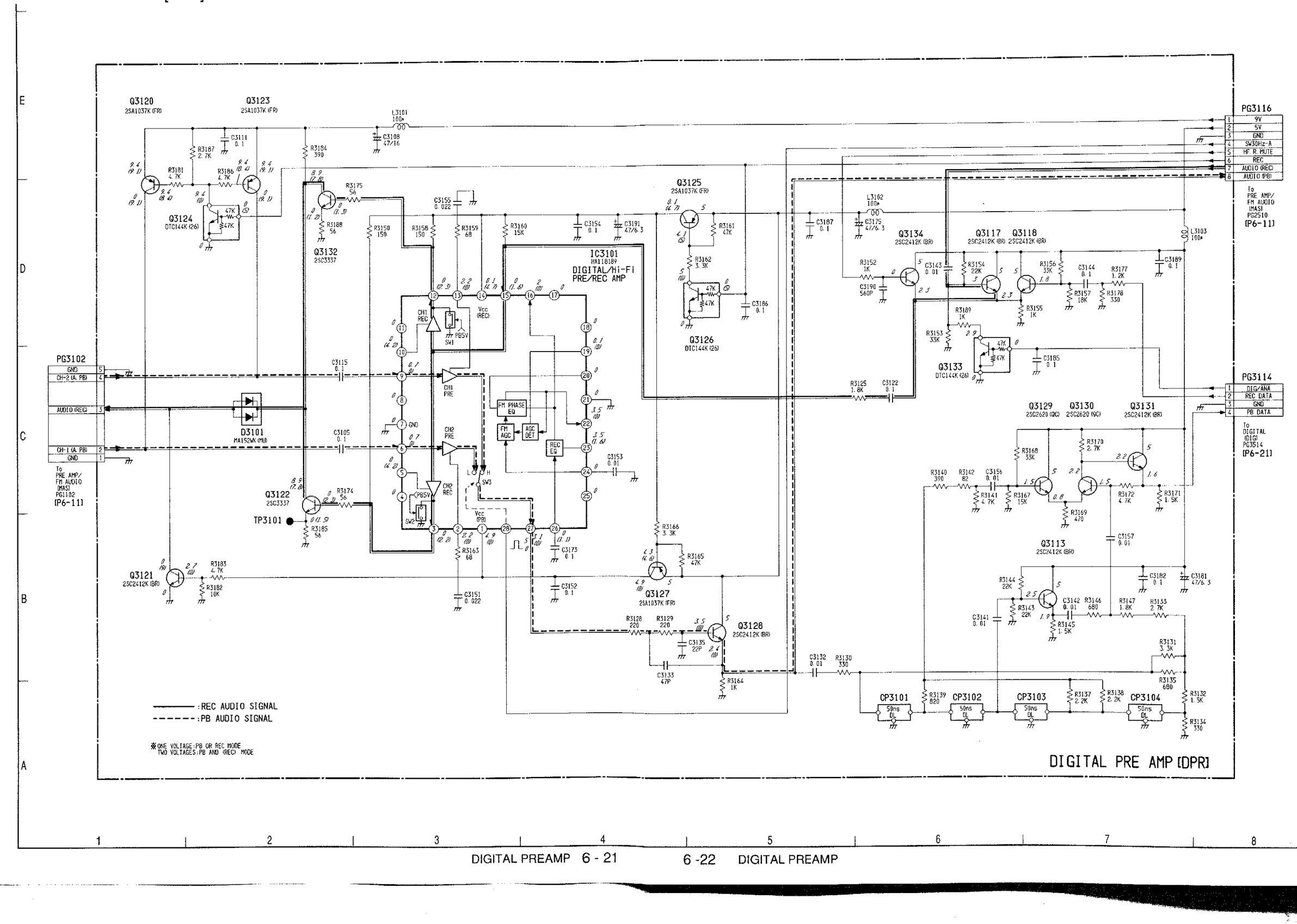
SWITCHING REGULATOR [MAS] SCHEMATIC DIAGRAM

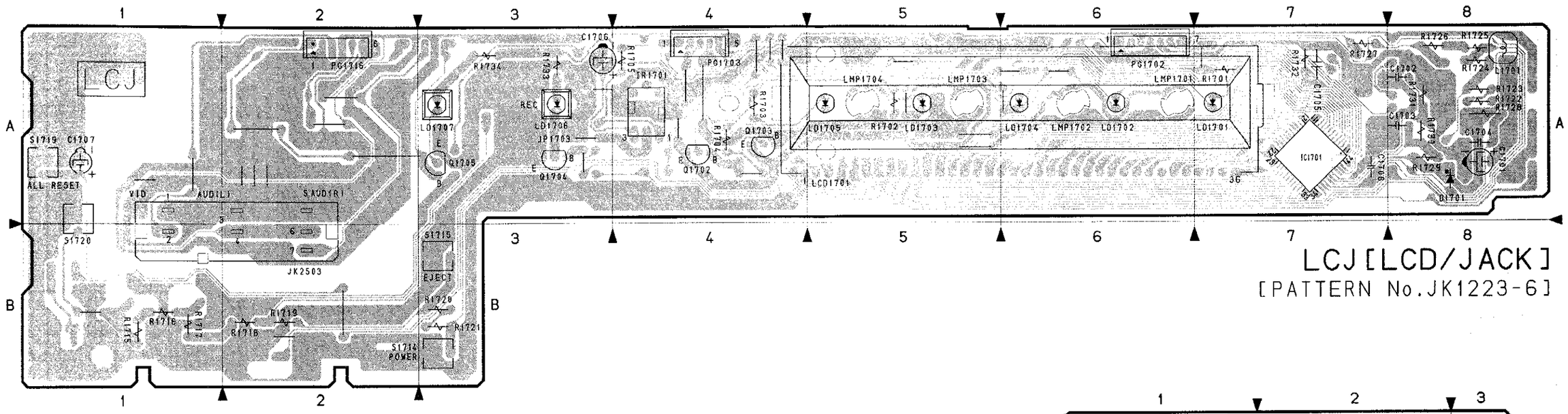


DIGITAL [DIG] SCHEMATIC DIAGRAM



DIGITAL PRE AMP [DJK] SCHEMATIC DIAGRAM





LCJ[LCD/JACK]
[PATTERN No.JK1223-6]

IDENTIFICATION OF PARTS LOCATION

LCJ [LCD/JACK]

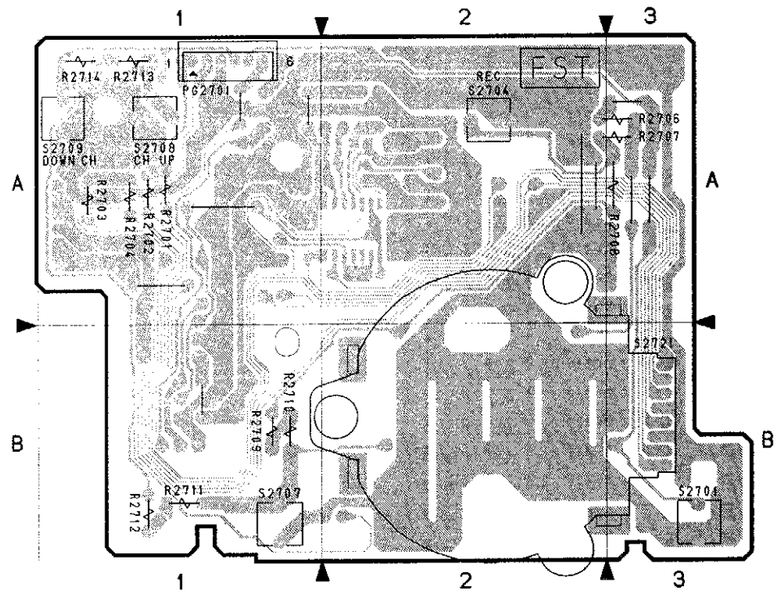
Symbol No.	Parts Location
C	
C1701	8A
C1702	8A
C1703	8A
C1704	8A
C1705	7A
C1706	3A
C1707	1A
C1708	7A
D	
D1701	8A
IC	
IC1701	7A
IR	
IR1701	4A
JK	
JK2503	2B
L	
L1701	8A
LCD	
LCD1701	5A
LD	
LD1701	7A
LD1702	6A
LD1703	5A
LD1704	6A
LD1705	5A

Symbol No.	Parts Location
LD1706	3A
LD1707	3A
LMP	
LMP1701	6A
LMP1702	6A
LMP1703	5A
LMP1704	5A
PG	
PG1702	6A
PG1703	4A
PG1716	2A
Q	
Q1702	4A
Q1703	4A
Q1704	3A
Q1705	3A
R	
R1701	7A
R1702	5A
R1703	4A
R1704	4A
R1705	4A
R1715	1B
R1716	1B
R1717	1B
R1718	2B
R1719	2B

Symbol No.	Parts Location
R1720	3B
R1721	3B
R1722	8A
R1723	8A
R1724	8A
R1725	8A
R1726	8A
R1727	7A
R1728	8A
R1729	8A
R1730	8A
R1731	8A
R1732	7A
R1733	3A
R1734	3A
S	
S1714	3B
S1715	3B
S1719	1A
S1720	1A

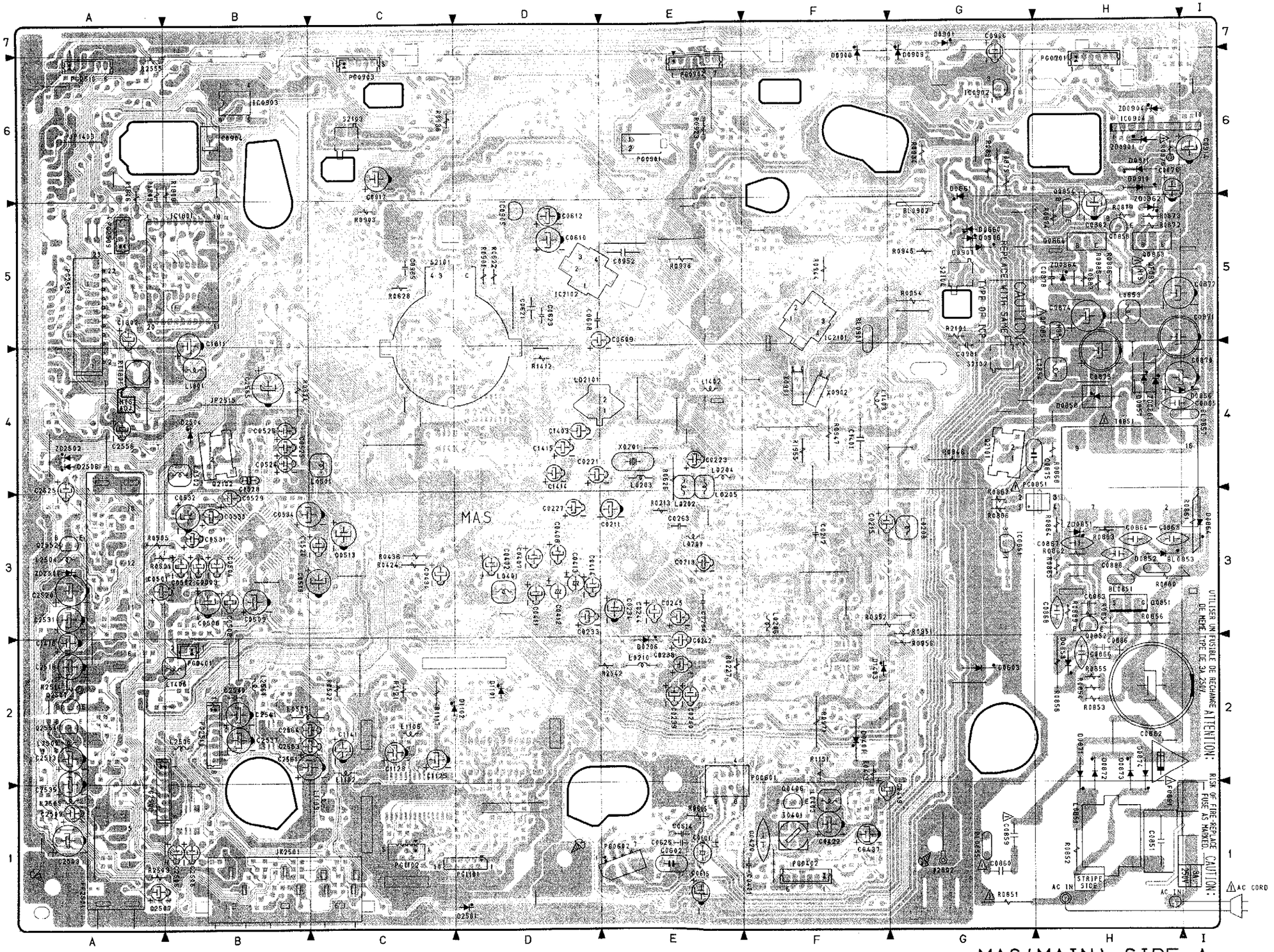
FST [FRONT SHUTTLE]

Symbol No.	Parts Location
PG	
PG2701	1A
R	
R2701	1A
R2702	1A
R2703	1A
R2704	1A
R2706	3A
R2707	3A
R2708	3A
R2709	1B
R2710	1B
R2711	1B
R2712	1B
R2713	1A
R2714	1A
S	
S2701	3B
S2704	2A
S2707	1B
S2708	1A
S2709	1A
S2721	3B



FST[FRONT SHUTTLE]
[PATTERN No.JK1223-6]

MAS CIRCUIT BOARD – SIDE A –



MAS(MAIN)-SIDE A-
[PATTERN No.JA1274-7]

IDENTIFICATION OF PARTS LOCATION

MAS [MAIN] 1/2

Symbol No.	Parts Location
BL	
BL0851	A-3H
BL0853	A-3H
BL0855	A-1G
BL0857	A-4I
BL0901	A-5F
BL0902	A-5G
C	
C0201	B-3F
C0204	B-2E
C0205	B-3E
C0208	B-3E
C0209	B-3F
C0211	A-3E
C0212	A-3F
C0213	A-3E
C0214	B-3F
C0215	A-3F
C0216	B-2F
C0218	B-2F
C0219	B-2F
C0220	B-3F
C0221	A-4D
C0222	B-4D
C0223	A-4E
C0224	B-4E
C0225	B-4E
C0226	B-3D
C0227	A-3D
C0228	B-3D
C0230	B-3D
C0233	A-3D
C0234	A-3E
C0235	B-3E
C0236	B-2E
C0237	B-2E
C0238	A-2E
C0239	A-2E
C0240	A-2E
C0241	B-2F
C0242	A-2E
C0243	B-3E
C0244	A-3E
C0245	A-3E
C0246	B-3E
C0247	B-3F
C0249	B-3E
C0251	A-3E
C0252	B-3E
C0254	B-3E
C0255	B-3E
C0256	B-2F
C0258	B-3E
C0260	B-3E
C0263	A-3E
C0264	B-3E
C0265	B-2F
C0273	B-2E
C0402	A-3D
C0403	B-3D
C0404	B-3D
C0407	A-3D
C0408	A-3D
C0409	B-3D
C0410	B-3D
C0411	A-3D
C0412	A-3D
C0413	A-3D
C0414	A-3D
C0419	A-1F
C0420	A-1F
C0421	A-1F
C0422	A-1F
C0424	B-1F
C0427	B-1F
C0429	B-3D
C0434	A-3C
C0437	A-1F
C0501	A-3A
C0502	A-3B
C0503	A-3B
C0504	A-3B
C0506	A-3B
C0507	B-3B
C0508	A-3B
C0509	A-3B
C0510	B-3B
C0511	B-3B
C0512	B-3C
C0513	A-3C
C0514	B-3B
C0517	B-3B
C0518	B-3C
C0519	A-3C
C0520	A-3C
C0521	B-3C
C0522	B-3B
C0524	A-4B
C0525	A-4B
C0526	A-4B
C0528	A-4B
C0529	A-3B
C0530	A-3B
C0531	A-3B
C0532	A-3B
C0533	B-3B
C0534	A-3C
C0535	B-4B
C0536	B-3B
C0537	B-2B
C0540	B-2C
C0601	A-1E
C0602	A-1E
C0604	B-1E
C0605	B-1E
C0606	B-4E
C0607	B-5D
C0608	A-5D
C0609	A-5E
C0610	A-5D
C0611	B-5D
C0612	A-5D
C0614	A-1E
C0615	A-1E
C0621	A-5D
C0622	B-6G
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C0859	A-1G
C0860	A-1G
C0862	A-2H
C0863	A-3H
C0864	A-3H
C0865	A-3H
C0866	A-2H
C0867	A-3H
C0868	A-3H
C0870	A-4H
C0871	A-5H
C0872	A-5H
C0873	A-4H
C0874	A-5H
C0875	A-4H
C0876	A-6H
C0878	A-5H
C0882	A-5H
C0885	A-4H
C0886	A-2H
C0888	A-3H
C0901	B-5E
C0902	B-6B
C0904	A-6B
C0906	A-6G
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C0914	A-6I
C0915	B-6H
C0916	B-6I
C0917	A-6C
C0918	B-6G
C0919	B-5E
C0922	B-6I
C0923	B-5D
C0924	B-5E
C0925	B-5E
C0926	B-5E
C0928	B-6G
C0940	B-5F
C0951	B-4D
C0952	A-5E
C0973	B-5F
C0974	B-6E
C0980	B-5F
C0981	A-4G
C0985	A-5C
C1114	B-1C
C1115	B-1C
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C1126	B-2C
C1127	B-2C
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C1405	B-4F
C1409	B-4E
C1410	B-4E
C1411	B-4E
C1413	B-5D
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C2556	A-4A
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C2562	B-2B
C2563	A-2B
C2564	A-2B
C2565	A-4B
D	
D0206	A-2E
D0401	A-2F
D0603	A-2G
D0852	A-3H
D0853	A-2H
D0856	A-4H
D0857	A-4H
D0858	A-4H
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D0873	A-2H
D0874	A-2H
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D0907	A-5G
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D0910	A-6H
D0911	A-6H
D1101	A-2D
D1102	A-2C
D1403	A-2F
D2501	A-1D
D2504	A-4B
D2505	B-2B
D2506	A-4A
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F0851	A-1I
FE	
FE2501	A-2A
IC	
IC0201	B-3E
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IC0851	A-3G
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IC0903	A-6B
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IC1801	A-5B
IC2101	A-5F
IC2102	A-5D
IC2501	B-1B
IC2561	B-2B
JK	
JK2501	A-1B
L	
L0202	A-4E
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L0204	A-4E
L0205	A-4E
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L0210	A-2E
L0401	A-3D
L0403	A-1F
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L1106	A-2C
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L1403	A-4F
L1406	A-2B
L1801	A-4B
L2502	A-2A
L2504	A-3A
L2505	A-1A
L2506	A-2B
L2561	A-2B
LD	
LD2101	A-4E
PC	
PC0851	A-3H
PG	
PG0401	A-2B
PG0402	A-1F
PG0601	A-2E
PG0602	A-1E
PG0701	A-6H
PG0702	A-6E
PG0703	A-6C
PG0901	A-6E
PG1101	A-1D
PG1102	A-1C
PG2508	A-1A
PG2509	A-5A
PG2510	A-2B
PG2513	A-5A
PG2516	A-6A
Q	
Q0226	B-2E
Q0403	B-1F
Q0405	B-1F
Q0406	A-1F
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Q0411	B-1F
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Q0413	B-1F
Q0451	B-1E
Q0502	B-2B
Q0851	A-3H
Q0852	A-3H
Q0853	A-5H
Q0854	A-5H
Q0855	B-6G
Q0858	A-5H
Q0859	B-5H
Q0864	A-5H
Q0905	B-6D
Q0906	B-6D
Q0911	B-5F
Q0912	B-5F
Q0913	B-5G
Q0914	B-6H
Q0931	B-4D
Q0932	B-4D
Q1101	B-2C
Q1102	B-2C
Q1151	B-2F
Q1401	B-4G
Q1404	B-5C
Q1407	B-1A
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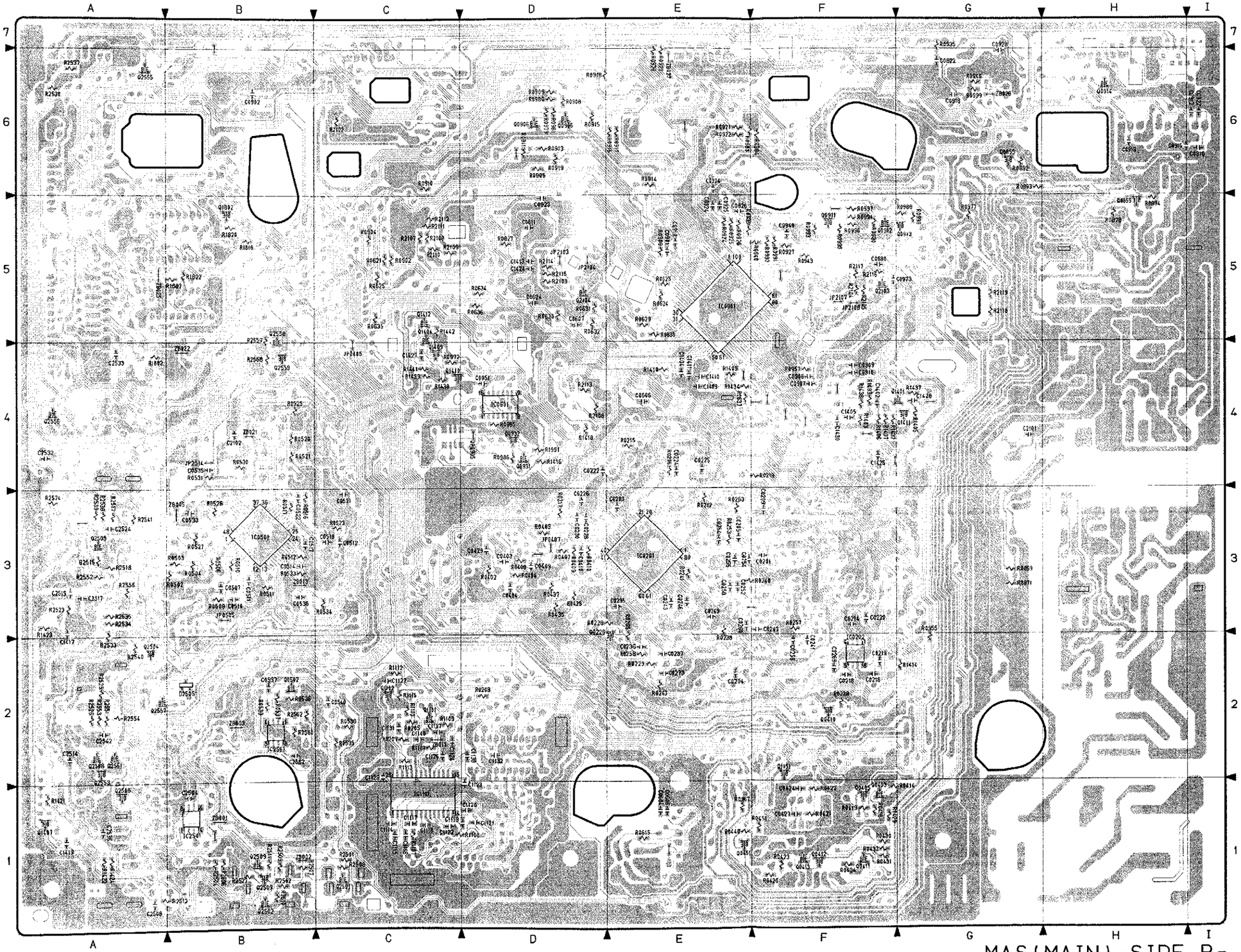
Q1412	B-5C
Q1802	B-5B
Q2101	A-4G
Q2102	A-4B
Q2103	B-5F
Q2104	B-5D
Q2501	B-1C
Q2502	B-1B
Q2503	B-1B
Q2504	B-2A
Q2505	B-3A
Q2506	B-1A
Q2507	A-2A
Q2508	B-2A
Q2509	B-1B
Q2551	B-2A
Q2552	A-3A
Q2553	B-2A
Q2554	A-2A
Q2555	B-6A
Q2556	B-4A
Q2557	B-2A
Q2558	B-5B
Q2559	B-4B
QF	
QF0851	A-5H
QF0852	A-5H
R	
R0205	B-2C
R0207	B-2C
R0208	B-2D
R0212	B-3E
R0213	A-3E
R0215	B-4E
R0216	B-4E
R0217	B-3D
R0218	B-4F
R0226	B-3E
R0227	A-2E
R0228	B-2F
R0229	B-2E
R0238	B-3E
R0240	B-3E
R0241	B-3E
R0243	B-2E
R0253	B-3E
R0257	B-3F
R0258	B-2E
R0263	B-3E
R0265	B-2E
R0402	B-3D
R0403	B-3D
R0404	B-3D
R0407	B-3D
R0408	B-3D
R0409	B-3D
R0410	B-3D
R0413	A-2F
R0414	B-1F
R0418	B-1F
R0419	B-1F
R0420	B-1F
R0421	B-1F
R0422	B-1F
R0423	B-1F
R0424	A-3C
R0425	B-3D
R0429	B-1F
R0430	B-1F
R0431	B-1F
R0432	B-1F
R0434	B-1F
R0435	B-3D
R0436	A-3C
R0437	B-3D
R0440	B-1E
R0451	B-1F
R0501	A-3A
R0502	B-3B
R0503	B-3B
R0504	B-3B
R0505	A-3A
R0506	B-3B
R0509	B-3B
R0510	B-3B
R0511	B-3B
R0512	B-3B
R0516	B-3B
R0517	B-3B
R0520	B-4B
R0521	B-4B
R0522	A-2C
R0523	B-3C
R0524	A-4B
R0525	B-4B
R0526	B-3B
R0527	B-3B
R0530	B-4B
R0531	B-4B
R0533	B-3B
R0534	B-3C
R0535	B-2C
R0536	B-2B
R0537	B-2B
R0538	B-2C
R0539	B-2B
R0605	A-1E
R0615	B-1E
R0621	B-5C
R0622	A-5D
R0623	B-5E
R0624	B-5E
R0625	B-5C
R0626	A-4E
R0627	B-5D
R0628	A-5C
R0629	B-5E
R0630	B-5E
R0631	B-5D

IDENTIFICATION OF PARTS LOCATION

MAS [MAIN] 2/2

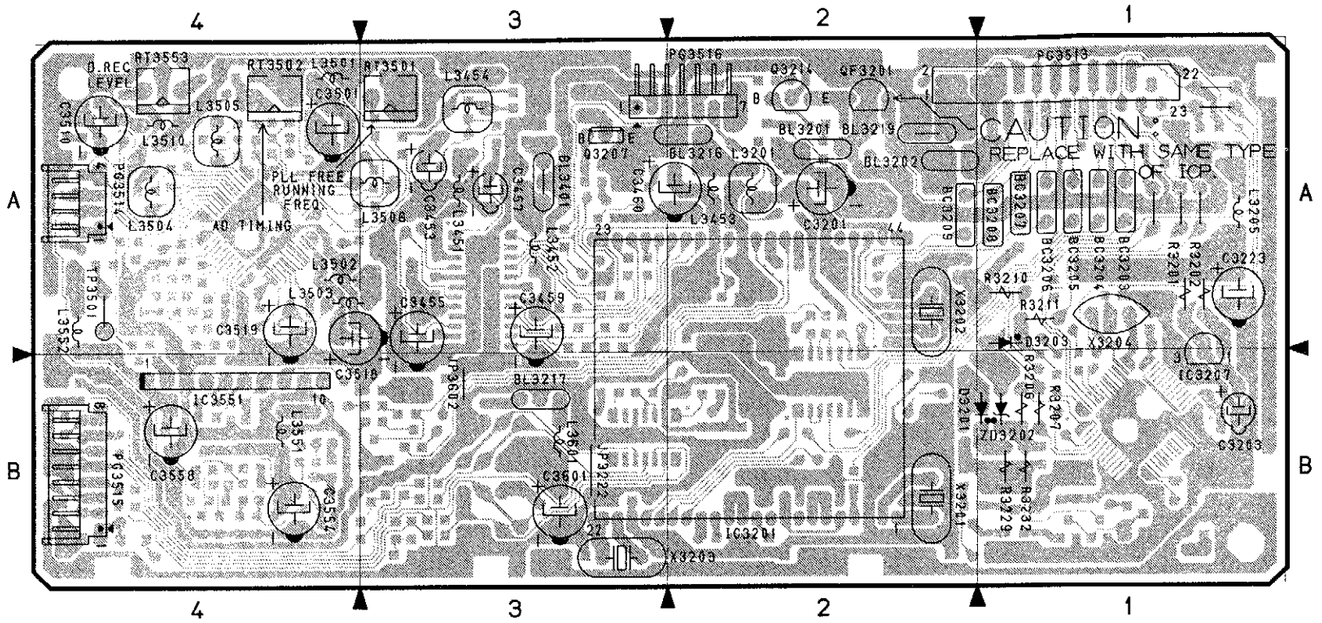
Symbol No.	Parts Location
R0632	B-5D
R0633	B-5D
R0634	B-5D
R0635	B-5C
R0636	B-5D
R0637	B-4E
R0851	A-1G
R0852	A-1H
R0853	A-2H
R0854	A-2H
R0855	A-2H
R0856	A-3H
R0857	A-3H
R0858	A-2H
R0860	A-3H
R0861	A-3I
R0862	A-3H
R0863	A-3H
R0864	A-3H
R0865	A-3H
R0866	A-3G
R0867	A-3G
R0868	A-4H
R0869	B-3G
R0871	B-3G
R0872	A-5H
R0873	A-5H
R0874	A-5H
R0875	A-6G
R0878	B-5H
R0879	A-5H
R0885	A-5H
R0886	A-5H
R0887	A-5H
R0889	A-3H
R0891	A-6G
R0892	B-6G
R0893	B-6G
R0894	B-5H
R0901	A-5D
R0902	B-5C
R0903	A-5C
R0904	B-5C
R0905	B-6D
R0906	B-5E
R0908	B-6D
R0909	B-6D
R0910	B-6C
R0911	B-6D
R0913	B-6D
R0914	B-6E
R0915	B-6D
R0916	B-6E
R0917	B-6E
R0918	B-6D
R0919	B-6D
R0921	B-6E
R0922	B-6E
R0923	A-6E
R0924	B-5E
R0925	B-5E
R0926	B-5E
R0927	B-5F
R0928	B-6E
R0929	B-6E
R0930	B-5F
R0934	A-6G
R0935	B-7G
R0938	A-6C
R0939	B-5E
R0940	B-5F
R0943	B-5F
R0944	A-5F
R0945	A-5G
R0946	A-4G
R0947	A-4F
R0948	B-6G
R0951	A-3G
R0952	A-3F
R0954	A-5G
R0955	B-2G
R0956	A-2G
R0957	B-4F
R0967	B-1E
R0971	A-2F
R0972	B-4C
R0976	A-6H
R0977	B-5G
R0978	A-5E
R0979	B-6D
R0980	B-6D
R0981	B-6D
R0983	B-6E
R0984	B-6F
R0985	B-4D
R0986	B-4D
R0988	B-5G
R0991	B-5F
R0992	B-5F
R0993	B-5F
R0994	B-5F
R0995	B-5F
R0996	B-5F
R0997	B-5F
R0998	B-5G
R0999	B-6G
R1107	B-1C
R1108	B-1C
R1109	B-2C
R1110	B-2C
R1112	B-2C
R1113	B-2C
R1115	B-2C
R1117	A-2C
R1118	B-2C
R1121	A-2C
R1151	A-2F
R1403	B-4F
R1405	B-4G
R1406	B-4F
R1407	B-4F
R1409	B-4E
R1410	B-4E
R1412	A-4D
R1414	B-2G
R1416	B-4D
R1418	B-4D
R1421	B-1A
R1422	B-1A
R1423	B-3A
R1424	B-1A
R1430	B-4C
R1432	B-4F
R1433	B-4F
R1434	B-4E
R1437	B-4G
R1438	B-4F
R1439	B-4C
R1441	B-4C
R1442	B-5C
R1802	B-4A
R1806	A-6A
R1807	B-5B
R1808	A-6B
R1809	A-6A
R1818	B-5B
R1820	B-5B
R1822	B-5B
R1951	B-4D
R1955	A-4F
R2101	A-5G
R2102	B-6C
R2103	B-5D
R2104	B-5F
R2105	B-5F
R2106	B-4D
R2107	B-5C
R2108	B-5C
R2109	B-5C
R2110	B-5C
R2111	B-5C
R2112	B-5C
R2113	B-4D
R2114	B-5D
R2115	B-5D
R2116	B-5F
R2117	B-5F
R2118	B-5G
R2119	B-5G
R2501	B-1C
R2502	B-1B
R2503	A-1A
R2504	B-1B
R2507	B-1B
R2508	B-1C
R2509	B-1B
R2510	B-1B
R2511	B-1B
R2512	B-1A
R2514	A-2A
R2515	B-3A
R2517	B-3A
R2518	B-3A
R2523	B-3A
R2524	B-3A
R2525	B-2A
R2526	B-2A
R2527	B-1B
R2530	B-6A
R2533	B-3A
R2534	B-3A
R2535	B-3A
R2536	B-1B
R2537	B-6A
R2538	B-3A
R2539	B-3A
R2540	B-2A
R2541	B-3A
R2542	A-2E
R2551	B-2A
R2552	B-3A
R2553	B-2A
R2554	B-2A
R2555	A-6A
R2556	B-3A
R2557	B-5B
R2558	B-4B
R2561	B-2B
R2562	B-2B
RT	
RT1801	A-4A
S	
S2101	A-5C
S2102	A-4G
S2103	A-6C
S2104	A-5G
T	
T0401	A-1F
T0851	A-4H
X	
X0201	A-4E
X0901	A-4F
X0902	A-4F
ZD	
ZD0851	A-3H
ZD0861	A-4H
ZD0862	A-5H
ZD0864	A-5H
ZD0901	A-6H
ZD0904	A-6H
ZD2501	A-3A
ZD2502	A-4A

MAS CIRCUIT BOARD -SIDE B-

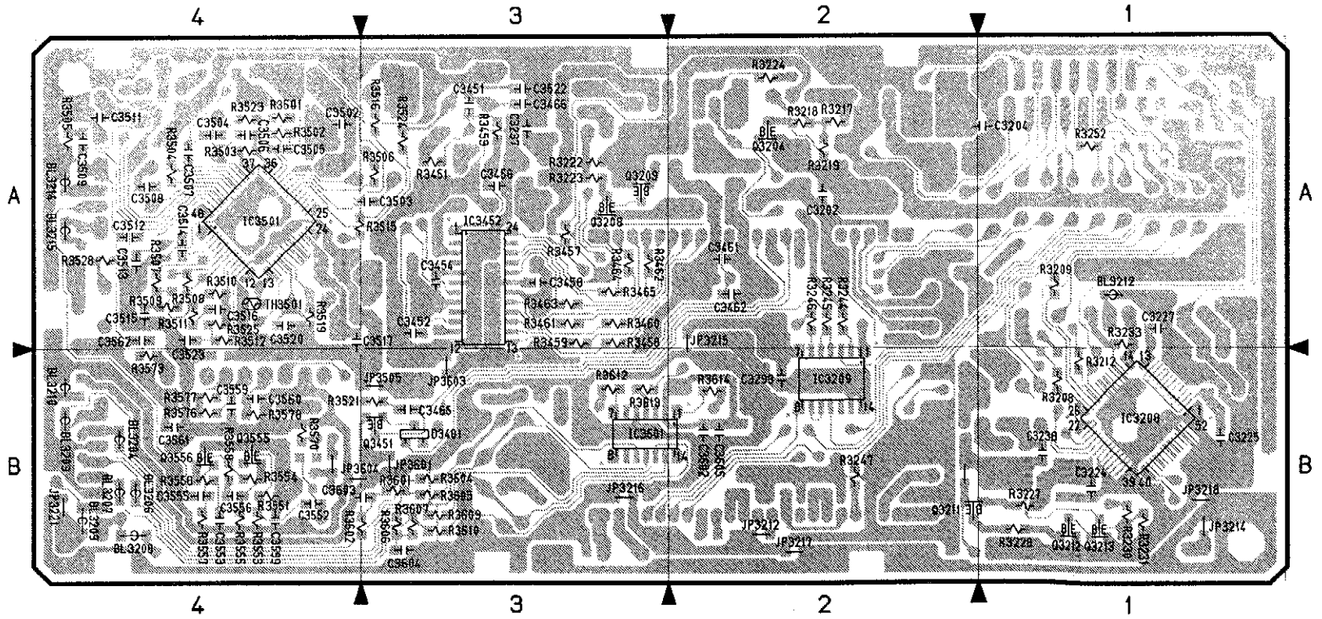


MAS(MAIN)-SIDE B-
[PATTERN No.JA1274-7]

DIGITAL CIRCUIT BOARD



DIG(DIGITAL)-SIDE A-
[PATTERN No.JA1338-5]

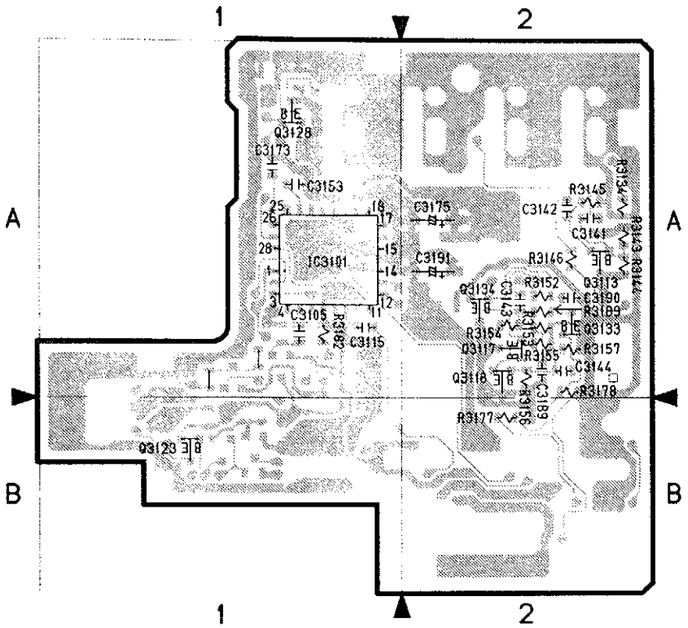


DIG(DIGITAL)-SIDE B-
[PATTERN No.JA1338-5]

IDENTIFICATION OF PARTS LOCATION

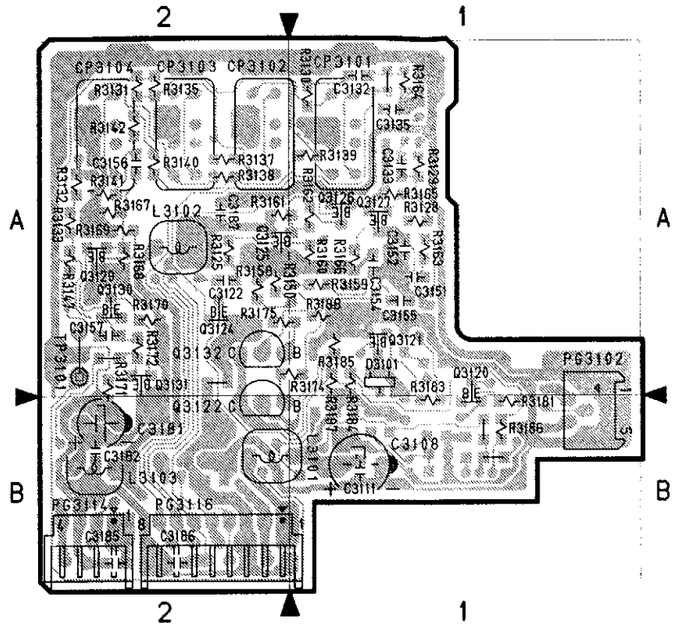
DIG [DIGITAL]

Symbol No.	Parts Location
BC	
BC3203	A-1A
BC3204	A-1A
BC3205	A-1A
BC3206	A-1A
BC3207	A-1A
BC3208	A-1A
BC3209	A-2A
BL	
BL3201	A-2A
BL3202	A-2A
BL3203	B-4B
BL3204	B-4B
BL3206	B-4B
BL3207	B-4B
BL3208	B-4B
BL3209	B-4B
BL3214	B-4A
BL3215	B-4A
BL3216	A-2A
BL3217	A-3B
C	
C3201	A-2A
C3202	B-2A
C3203	A-1B
C3204	B-1A
C3223	A-1A
C3224	B-1B
C3225	B-1B
C3227	B-1A
C3237	B-3A
C3238	B-1B
C3299	B-2B
C3451	B-3A
C3452	B-3A
C3453	A-3A
C3454	B-3A
C3455	A-3A
C3456	B-3A
C3457	A-3A
C3458	B-3A
C3459	A-3A
C3460	A-2A
C3461	B-2A
C3462	B-2A
C3465	B-3B
C3466	B-3A
C3501	A-4A
C3502	B-4A
C3503	B-3A
C3504	B-4A
C3505	B-4A
C3506	B-4A
C3507	B-4A
C3508	B-4A
C3509	B-4A
C3510	A-4A
C3511	B-4A
C3512	B-4A
C3513	B-4A
C3514	B-4A
C3515	B-4A
C3516	B-4A
C3517	B-4A
C3518	A-4A
C3519	A-4A
C3520	B-4A
C3522	B-3A
C3523	B-4A
C3552	B-4B
C3553	B-4B
C3554	A-4B
C3555	B-4B
C3556	B-4B
C3558	A-4B
C3559	B-4B
C3560	B-4B
C3561	B-4B
C3562	B-4A
C3599	B-4B
C3601	A-3B
C3602	B-2B
C3603	B-3B
C3604	B-3B
C3605	B-2B
D	
D3201	A-1B
D3203	A-1A
D3401	B-3B
IC	
IC3201	A-2B
IC3207	A-1B
IC3208	B-1B
IC3209	B-2B
IC3452	B-3A
IC3501	B-4A
IC3551	A-4B
IC3601	B-3B
L	
L3201	A-2A
L3205	A-1A
L3451	A-3A
L3452	A-3A
L3453	A-2A
L3454	A-3A
L3501	A-4A
L3502	A-4A
L3503	A-4A
L3504	A-4A
L3505	A-4A
L3506	A-3A
L3510	A-4A
L3551	A-4B
L3552	A-4A
L3601	A-3B
PG	
PG3513	A-1A
PG3514	A-4A
PG3515	A-4B
PG3516	A-2A
Q	
Q3204	B-2A
Q3207	A-3A
Q3208	B-3A
Q3209	B-3A
Q3211	B-2B
Q3212	B-1B
Q3213	B-1B
Q3214	A-2A
Q3451	B-3B
Q3555	B-4B
Q3556	B-4B
QF	
QF3201	A-2A
R	
R3201	A-1A
R3202	A-1A
R3206	A-1B
R3207	A-1B
R3208	B-1B
R3209	B-1A
R3210	A-1A
R3211	A-1A
R3212	B-1B
R3217	B-2A
R3218	B-2A
R3219	B-2A
R3222	B-3A
R3223	B-3A
R3224	B-2A
R3227	B-1B
R3228	B-1B
R3229	A-1B
R3230	B-1B
R3231	B-1B
R3232	A-1B
R3233	B-1A
R3244	B-2A
R3245	B-2A
R3246	B-2A
R3247	B-2B
R3252	B-1A
R3451	B-3A
R3453	B-3A
R3457	B-3A
R3458	B-3A
R3459	B-3A
R3460	B-3A
R3461	B-3A
R3462	B-3A
R3463	B-3A
R3464	B-3A
R3465	B-3A
R3501	B-4A
R3502	B-4A
R3503	B-4A
R3504	B-4A
R3505	B-4A
R3506	B-3A
R3507	B-4A
R3508	B-4A
R3509	B-4A
R3510	B-4A
R3511	B-4A
R3512	B-4A
R3515	B-4A
R3516	B-3A
R3519	B-4A
R3521	B-3B
R3523	B-4A
R3524	B-3A
R3525	B-4A
R3528	B-4A
R3551	B-4B
R3553	B-4B
R3554	B-4B
R3555	B-4B
R3556	B-4B
R3557	B-4B
R3558	B-4B
R3570	B-4B
R3573	B-4B
R3576	B-4B
R3577	B-4B
R3578	B-4B
R3601	B-3B
R3602	B-3B
R3604	B-3B
R3605	B-3B
R3606	B-3B
R3607	B-3B
R3609	B-3B
R3610	B-3B
R3612	B-3B
R3613	B-3B
R3614	B-2B
RT	
RT3501	A-3A
RT3502	A-4A
RT3553	A-4A
TH	
TH3501	B-4A
TP	
TP3501	A-4A
X	
X3201	A-2B
X3202	A-2A
X3203	A-3B
X3204	A-1A
ZD	
ZD3202	A-1B



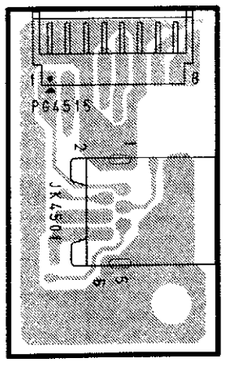
DPR(DIGITAL PREAMP) -SIDE A-

[PATTERN No.JA1281-6]



DPR(DIGITAL PREAMP) -SIDE B-

[PATTERN No.JA1281-6]



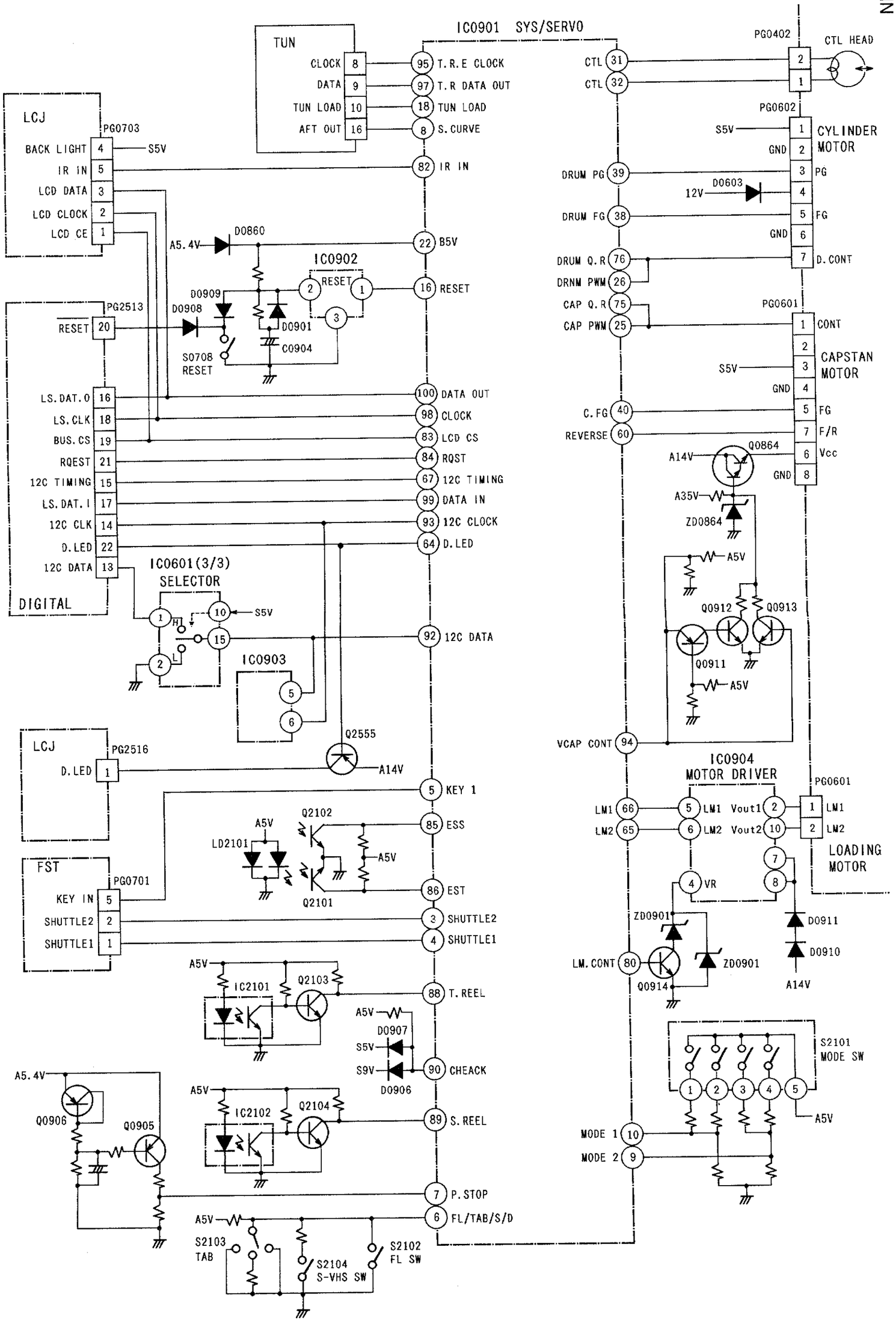
DJK(DIGITAL JACK)

[PATTERN No.JA1281-6]

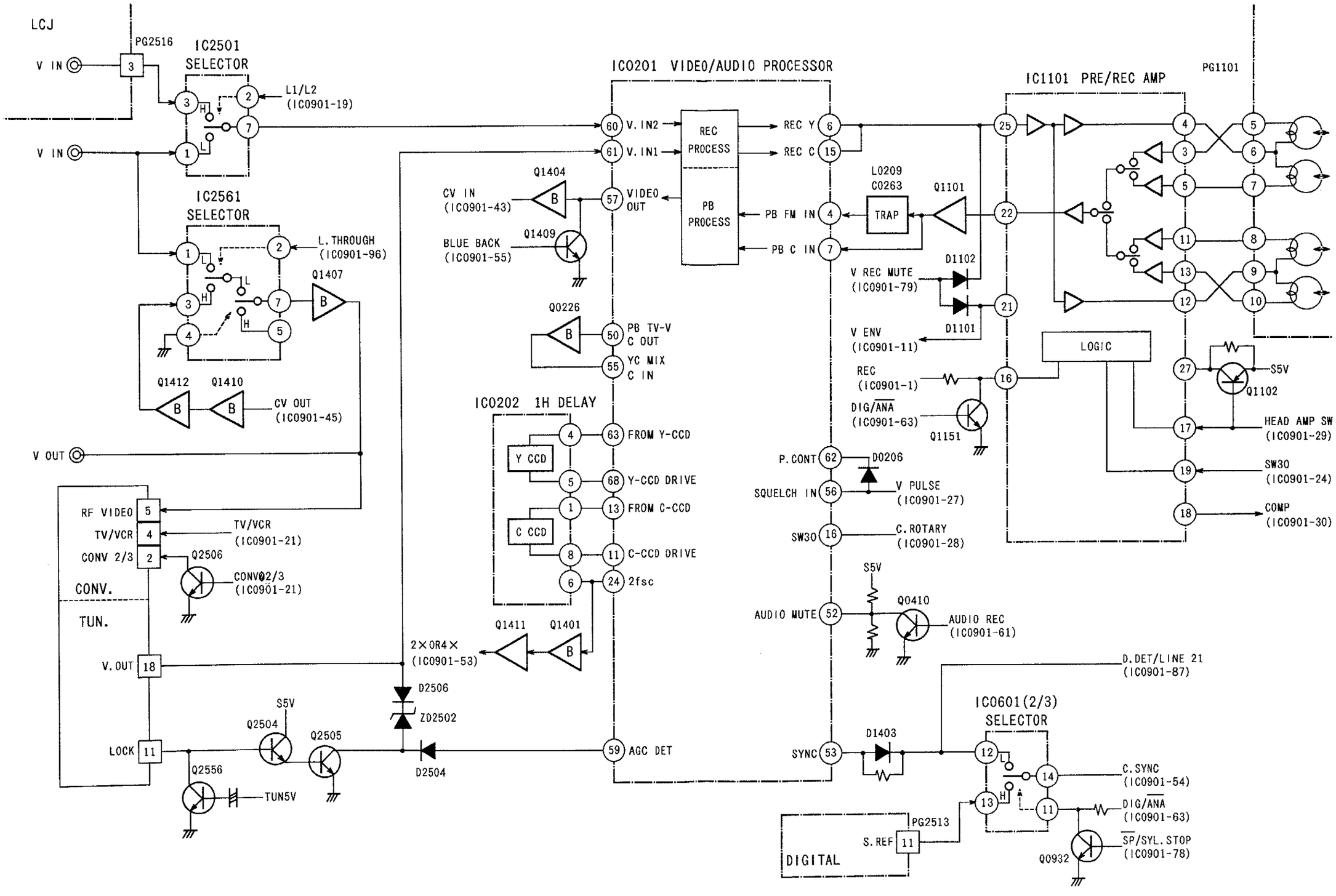
IDENTIFICATION OF PARTS LOCATION

DPR [DIGITAL PREAMP]

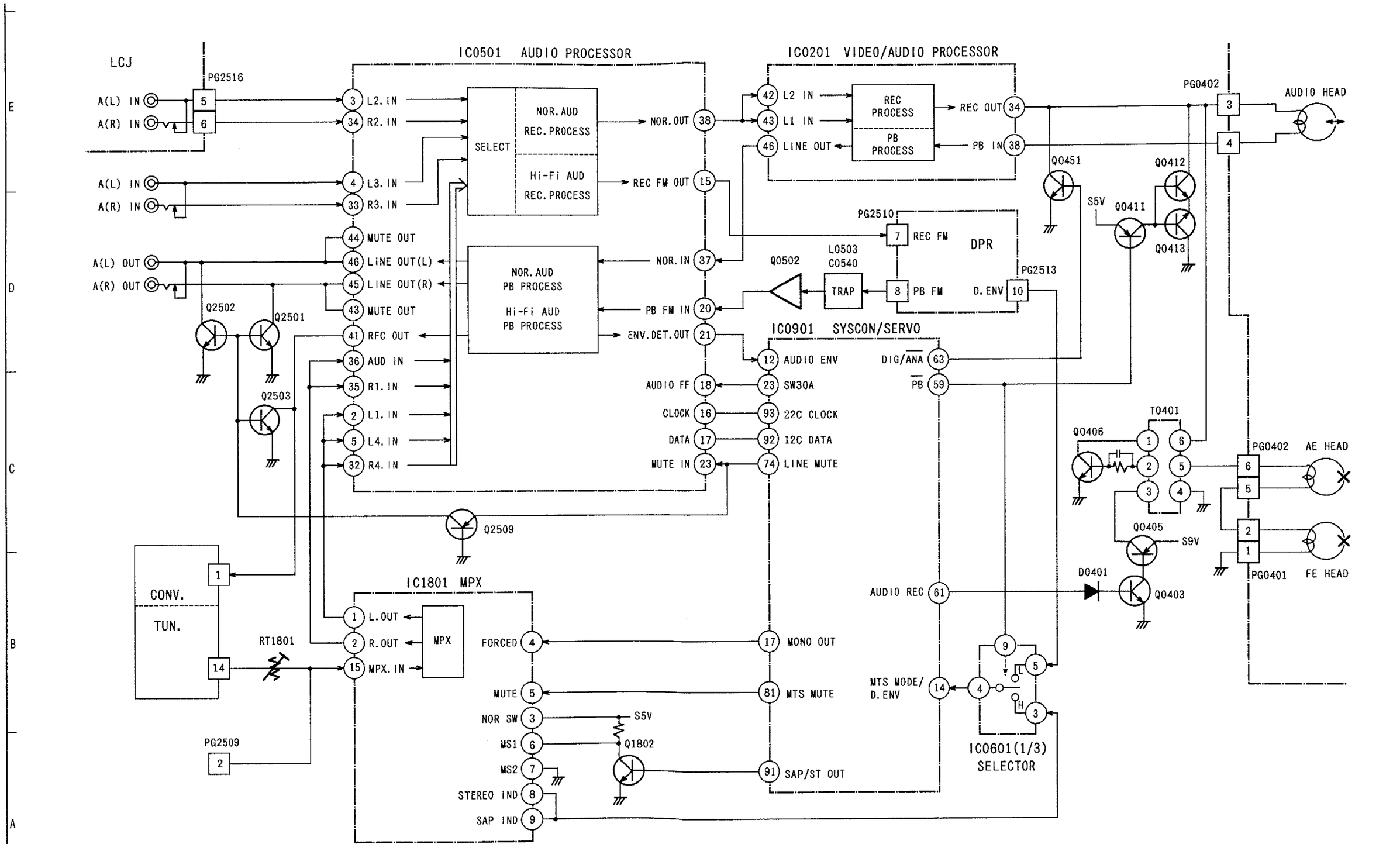
Symbol No.	Parts Location
C	
C3105	A-1A
C3108	B-1B
C3111	B-1B
C3115	A-1A
C3122	B-2A
C3132	B-1A
C3133	B-1A
C3135	B-1A
C3141	A-2A
C3142	A-2A
C3143	A-2A
C3144	A-2A
C3151	B-1A
C3152	B-1A
C3153	A-1A
C3154	B-1A
C3155	B-1A
C3156	B-2A
C3157	B-2A
C3173	A-1A
C3175	A-2A
C3181	B-2B
C3182	B-2B
C3185	B-2B
C3186	B-2B
C3187	B-2A
C3189	A-2A
C3190	A-2A
C3191	A-2A
CP	
CP3101	B-1A
CP3102	B-2A
CP3103	B-2A
CP3104	B-2A
D	
D3101	B-1A
IC	
IC3101	A-1A
L	
L3101	B-2B
L3102	B-2A
L3103	B-2B
PG	
PG3102	B-1B
PG3114	B-2B
PG3116	B-2B
Q	
Q3113	A-2A
Q3117	A-2A
Q3118	A-2A
Q3120	B-1B
Q3121	B-1A
Q3122	B-2B
Q3123	A-1B
Q3124	B-2A
Q3125	B-2A
Q3126	B-1A
Q3127	B-1A
Q3128	A-1A
Q3129	B-2A
Q3130	B-2A
Q3131	B-2A
Q3132	B-2A
Q3133	A-2A
Q3134	A-2A
R	
R3125	B-2A
R3128	B-1A
R3129	B-1A
R3130	B-1A
R3131	B-2A
R3132	B-2A
R3133	B-2A
R3134	A-2A
R3135	B-2A
R3137	B-2A
R3138	B-2A
R3139	B-1A
R3140	B-2A
R3141	B-2A
R3142	B-2A
R3143	A-2A
R3144	A-2A
R3145	A-2A
R3146	A-2A
R3147	B-2A
R3150	B-2A
R3152	A-2A
R3153	A-2A
R3154	A-2A
R3155	A-2A
R3156	A-2A
R3157	A-2A
R3158	B-2A
R3159	B-1A
R3160	B-1A
R3161	B-2A
R3162	B-1A
R3163	B-1A
R3164	B-1A
R3165	B-1A
R3166	B-1A
R3167	B-2A
R3168	B-2A
R3169	B-2A
R3170	B-2A
R3171	B-2A
R3172	B-2A
R3174	B-1A
R3175	B-2A
R3177	A-2B
R3178	A-2A
R3181	B-1B
R3182	A-1A
R3183	B-1B
R3184	B-1A
R3185	B-1A
R3186	B-1B
R3187	B-1A
R3188	B-1A
R3189	A-2A
TP	
TP3101	B-2A

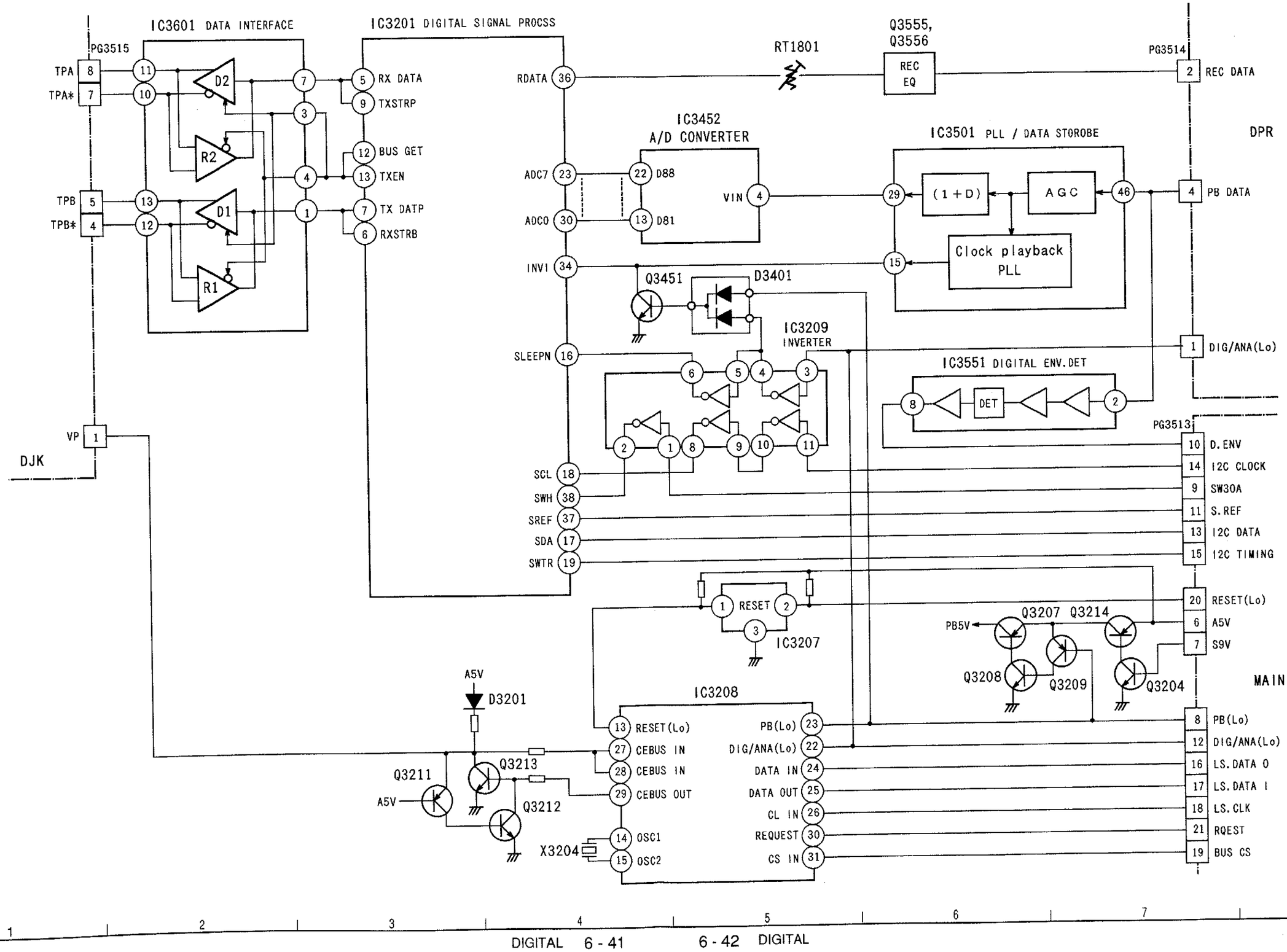

IC0901 SYS/SERVO
TUN
CLOCK 8
DATA 9
TUN LOAD 10
AFT OUT 16
95 T.R.E CLOCK
97 T.R DATA OUT
18 TUN LOAD
8 S.CURVE
LCJ
PG0703
BACK LIGHT 4
IR IN 5
LCD DATA 3
LCD CLOCK 2
LCD CE 1
S5V
82 IR IN
A5.4V
D0860
22 B5V
IC0902
RESET
D0909
D0908
D0901
C0904
S0708 RESET
16 RESET
PG2513
RESET 20
LS.DAT.O 16
LS.CLK 18
BUS.CS 19
RQEST 21
12C TIMING 15
LS.DAT.I 17
12C CLK 14
D.LED 22
12C DATA 13
100 DATA OUT
98 CLOCK
83 LCD CS
84 RQST
67 12C TIMING
99 DATA IN
93 12C CLOCK
64 D.LED
IC0601(3/3)
SELECTOR
DIGITAL
S5V
92 12C DATA
IC0903
LCJ
PG2516
D.LED 1
Q2555
A14V
5 KEY 1
FST
PG0701
KEY IN 5
SHUTTLE2 2
SHUTTLE1 1
A5V
LD2101
Q2102
Q2101
85 ESS
86 EST
3 SHUTTLE2
4 SHUTTLE1
IC2101
Q2103
88 T.REEL
D0907
S9V
D0906
90 CHEACK
A5.4V
Q0906
Q0905
IC2102
Q2104
89 S.REEL
7 P.STOP
6 FL/TAB/S/D
S2103 TAB
S2104 S-VHS SW
S2102 FL SW
PG0402
CTL HEAD
CTL 31
CTL 32
PG0602
CYLINDER MOTOR
DRUM PG 39
DRUM FG 38
D0603
12V
DRUM Q.R 76
DRNM PWM 26
CAP Q.R 75
CAP PWM 25
PG0601
CONT
CAPSTAN MOTOR
C.FG 40
REVERSE 60
Q0864
A14V
A35V
ZD0864
A5V
Q0912
Q0913
Q0911
VCAP CONT 94
IC0904
MOTOR DRIVER
LM1 66
LM2 65
LM1 Vout1
LM2 Vout2
LOADING MOTOR
VR
ZD0901
D0911
D0910
LM.CONT 80
Q0914
S2101
MODE SW
MODE 1 10
MODE 2 9

2. VIDEO

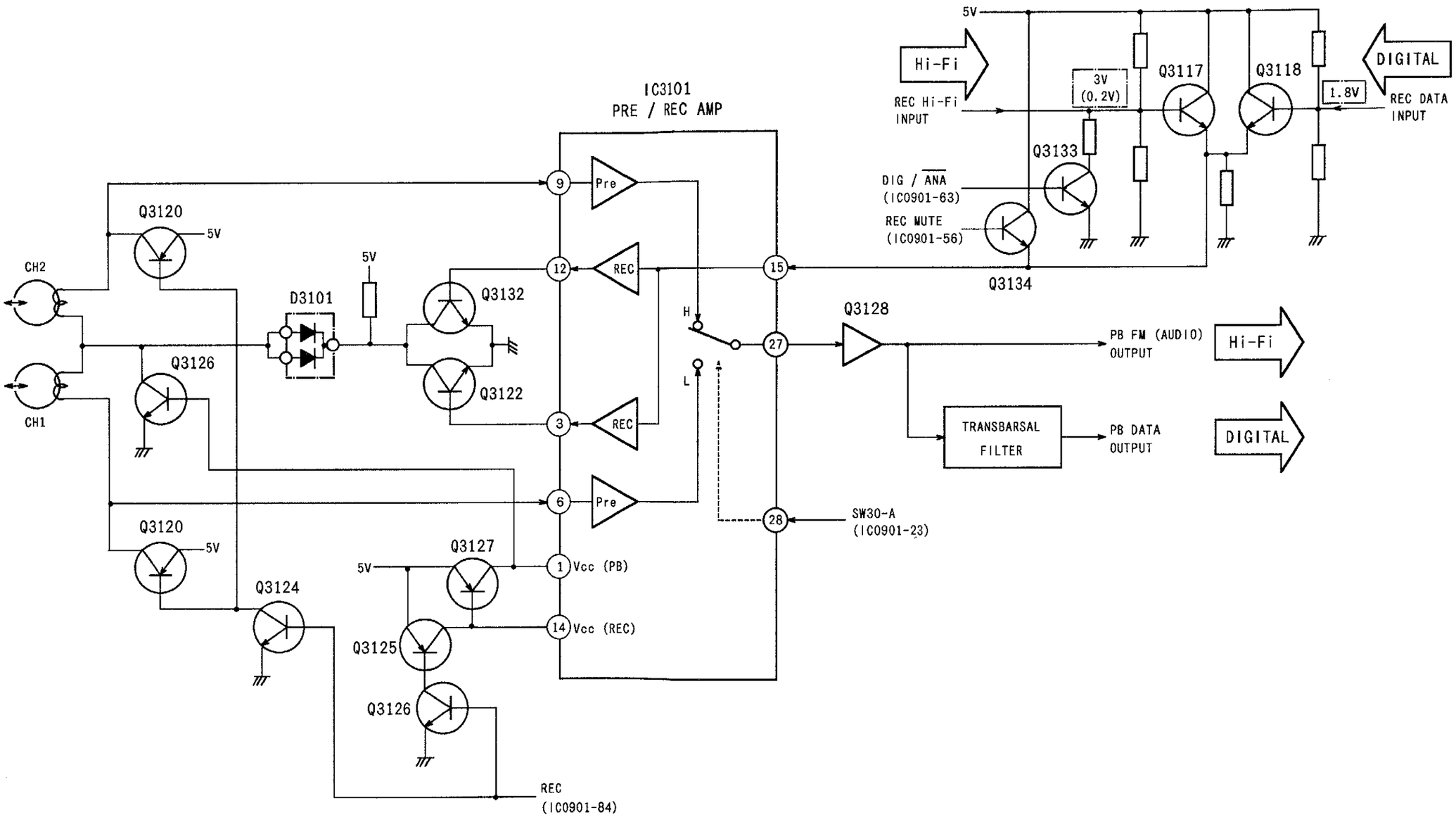

LCJ
PG2516
V IN
IC2501
SELECTOR
L1/L2
(IC0901-19)
V IN
IC2561
SELECTOR
L. THROUGH
(IC0901-96)
Q1407
Q1412
Q1410
CV OUT
(IC0901-45)
V OUT
RF VIDEO
TV/VCR
TV/VCR
(IC0901-21)
CONV 2/3
Q2506
CONV 2/3
(IC0901-21)
CONV.
TUN.
V. OUT
LOCK
Q2556
TUN5V
S5V
Q2504
Q2505
D2506
ZD2502
D2504
2×OR4×
(IC0901-53)
Q1411
Q1401
AGC DET
IC0201 VIDEO/AUDIO PROCESSOR
V. IN2
V. IN1
VIDEO OUT
REC PROCESS
PB PROCESS
CV IN
(IC0901-43)
Q1404
BLUE BACK
(IC0901-55)
Q1409
Q0226
PB TV-V
C OUT
YC MIX
C IN
IC0202 1H DELAY
Y CCD
C CCD
FROM Y-CCD
Y-CCD DRIVE
FROM C-CCD
C-CCD DRIVE
2fsc
REC Y
REC C
PB FM IN
PB C IN
L0209
C0263
TRAP
Q1101
V REC MUTE
(IC0901-79)
D1102
D1101
V ENV
(IC0901-11)
REC
(IC0901-1)
DIG/ANA
(IC0901-63)
Q1151
P. CONT
D0206
V PULSE
(IC0901-27)
SQUELCH IN
SW30
C. ROTARY
(IC0901-28)
S5V
AUDIO MUTE
Q0410
AUDIO REC
(IC0901-61)
SYNC
D1403
IC1101 PRE/REC AMP
PG1101
LOGIC
S5V
Q1102
HEAD AMP SW
(IC0901-29)
SW30
(IC0901-24)
COMP
(IC0901-30)
D. DET/LINE 21
(IC0901-87)
IC0601(2/3)
SELECTOR
C. SYNC
(IC0901-54)
DIG/ANA
(IC0901-63)
SP/SYL. STOP
(IC0901-78)
Q0932
PG2513
S. REF
DIGITAL

3. AUDIO


LCJ
PG2516
A(L) IN
A(R) IN
A(L) OUT
A(R) OUT
IC0501 AUDIO PROCESSOR
SELECT
NOR. AUD REC. PROCESS
Hi-Fi AUD REC. PROCESS
NOR. AUD PB PROCESS
Hi-Fi AUD PB PROCESS
L2. IN
R2. IN
L3. IN
R3. IN
MUTE OUT
LINE OUT(L)
LINE OUT(R)
MUTE OUT
RFC OUT
AUD IN
R1. IN
L1. IN
L4. IN
R4. IN
NOR. OUT
REC FM OUT
NOR. IN
PB FM IN
ENV. DET. OUT
AUDIO FF
CLOCK
DATA
MUTE IN
IC0201 VIDEO/AUDIO PROCESSOR
L2 IN
L1 IN
LINE OUT
REC PROCESS
PB PROCESS
REC OUT
PB IN
PG0402
AUDIO HEAD
Q0451
Q0412
Q0411
Q0413
S5V
PG2510
REC FM
DPR
PG2513
D. ENV
PB FM
L0503
C0540
TRAP
Q0502
Q2502
Q2501
Q2503
Q2509
IC0901 SYSCON/SERVO
AUDIO ENV
SW30A
22C CLOCK
12C DATA
LINE MUTE
DIG/ANA
PB
T0401
Q0406
PG0402 AE HEAD
Q0405
S9V
D0401
Q0403
PG0401 FE HEAD
AUDIO REC
IC1801 MPX
L. OUT
R. OUT
MPX. IN
MPX
FORCED
MUTE
NOR SW
MS1
MS2
STEREO IND
SAP IND
MONO OUT
MTS MUTE
SAP/ST OUT
S5V
Q1802
CONV.
TUN.
RT1801
PG2509
MTS MODE/ D. ENV
IC0601(1/3) SELECTOR


IC3601 DATA INTERFACE
IC3201 DIGITAL SIGNAL PROCESS
PG3515
TPA
TPA*
TPB
TPB*
D2
D1
R2
R1
RX DATA
TXSTRP
BUS GET
TXEN
TX DATP
RXSTRB
VP
DJK
RDATA
RT1801
Q3555,
Q3556
REC
EQ
PG3514
REC DATA
DPR
IC3452
A/D CONVERTER
ADC7
ADC0
D88
D81
VIN
IC3501 PLL / DATA STOROBE
(1+D)
AGC
Clock playback
PLL
PB DATA
INV1
Q3451
D3401
IC3209
INVERTER
SLEEPN
DIG/ANA(Lo)
IC3551 DIGITAL ENV.DET
DET
PG3513
D. ENV
I2C CLOCK
SW30A
S. REF
I2C DATA
I2C TIMING
SCL
SWH
SREF
SDA
SWTR
RESET
IC3207
RESET(Lo)
A5V
S9V
Q3207
Q3214
Q3208
Q3209
Q3204
PB5V
MAIN
D3201
IC3208
CEBUS IN
CEBUS IN
CEBUS OUT
OSC1
OSC2
X3204
Q3211
Q3213
Q3212
PB(Lo)
DIG/ANA(Lo)
DATA IN
DATA OUT
CL IN
REQUEST
CS IN
LS. DATA O
LS. DATA I
LS. CLK
RQEST
BUS CS

5. DIGITAL PREAMP



Microprocessor Pin Function Tables

1. LCD DRIVER (IC1701)

Pin No.	I/O	Active Level	Abbreviation	Function
1	O	Pulse	SEGMENT 1	LCD segment control outputs.
2	O	Pulse	SEGMENT 2	
|	|	|	|
|	|	|	|
|	|	|	|
31	O	Pulse	SEGMENT 31	
32	O	Pulse	SEGMENT 32	
33	O	Pulse	COM1	LCD common (COM) control outputs.
34	O	Pulse	COM2	
35	O	Pulse	COM3	
36	I	Lo	RESET(L)	Initializes the LCD-uP when power is supplied.
37	I	Hi	VDD	A5V power input.
38	I	-	VDD 1	LCD drive bias.
39	I	-	VDD 2	LCD drive bias.
40	-	Lo	VSS	Ground.
41	I/O	-	OSC	Generates a 32kHz signal for key scanning.
42	I	Lo	LCD. LOAD (L)	LOAD signal between the M-uP and LCD-uP. "Lo" input enables chip select.
43	I	Pulse	CLOCK (M-LCD)	The data transferred from the M-uP, synchronized with the clock signal.
44	I	Pulse	DATA (M-LCD)	

2. MAIN uP (IC901)

Pin No.	I/O	Active Level	Abbreviation	Function
1	O	Hi	REC	Sets the video and audio head amp circuits to the recording mode.
2	-	-	GND	Ground.
3	I	A/D	SHUTTLE 2	Inputs from the shuttle dial switches. The shuttle speed and direction are determined.
4	I	A/D	SHUTTLE 1	
5	I	A/D	KEY IN	Key matrix input.
6	I	A/D	FL/TAB/S/D	Input to detect the cassette position/erase prevention tab and S or D-VHS cassette. 5.0V: TAB SW OFF, S-VHS SW OFF (VHS tape with tab) 3.8V: TAB SW ON, S-VHS SW OFF (VHS tape without tab) 3.1V: TAB SW OFF, S-VHS SW ON (D-VHS or S-VHS tape with tab) 2.6V: TAB SW ON, S-VHS SW ON (D-VHS or S-VHS tape without tab)
7	I	Lo	POWER. STOP(L)	When A5V voltage drops and "Lo" is input, the M-uP detects that a power failure has occurred.
8	I	Hi	S-CURVE	Detects the AFT (S-CURVE) signal from the IF unit to fine tune to a station.
9	I	A/D	M. STATE 3/4	The signals which detect the mechanism state are input to control the loading motor.
10	I	A/D	M. STATE 1/2	
11	I	A/D	ENV.(VIDEO)	Audio and video envelope level inputs for autotracking.
12	I	A/D	ENV.(AUDIO)	
13	I	A/D	MODEL SW	Model switching control.
14	I	H/MH/ ML/L A/D	MTS MODE/ D. ENV.	Lo: Stereo + SAP signal input, Mid low: Mono + SAP signal input, Mid high: Stereo signal input, Hi: Mono signal input. Digital envelope level inputs for autotracking. (only digital playback)
15	I	-	A5V	Connected to A5V.
16	I	Lo	RESET (L)	Initializes the M-uP when power is supplied.
17	O	Hi	MONO OUT	Output to control the MTS decoder output mode to mono.
18	O	Hi	TUNER LOAD	A deta line is provided between the M-uP and U/V tuner and the uP sets the LOAD pin to "Hi" when transfering data and holds it until transfer is completed.
19	O	Lo/Hi	L1(Lo)/L2	L1/L2 switching control signal output.
20	O	Lo/Hi	CONV.CH-3/CH-4	CH-3/CH-4 switching control signal output.
21	O	Hi/Lo	TV(Lo)/VCR	RF converter (VCR/TV switching) control signal output.
22	I	-	B5V	Connected to B5V.
23	O	Pulse	SW30Hz-A	Head switching pulse output for audio circuits.
24	O	Pulse	SW30Hz	Head switching pulse output.
25	O	PWM	CAPST. PWM	Cylinder and capstan motor servo control outputs.
26	O	PWM	DRUM. PWM	
27	O	Hi	V.PULSE	Artificial V sync signal for trick play.
28	O	Pulse	C.ROTARY	Chroma rotation control signal.
29	O	Hi/Lo	H.AMP SW	SP/EP head switching control signal (pulse during trick play).
30	I	Hi/Lo	COMP	SP/EP head switching control signal (pulse during trick play).
31	I/O	Pulse	CTL (+)	CTL signal input/output.
32	I/O	Pulse	CTL (-)	
33	-	-	GND	Ground.
34	I	Pulse	CTL AMP 1	CTL amp inputs.
35	I	Pulse	CTL AMP 2	
36	I	Pulse	CTL AMP 3	
37	O	Pulse	CTL AMP(O)	CTL amp outputs.
38	I	Pulse	CYL.FG	Cylinder FG (CYL.FG) pulse input. Controls the cylinder speed during recording and playback.
39	I	Pulse	TACH PULSE	Tach pluse input. Comparison (feedback) signal which controls the recording cylinder phase.

Pin	EJECT	UNLOAD	REV.	R. SLOW	SLOW	R/P	STOP2	FF/REW
13	0	2.5	1.8	2.5	3.05	3.05	2.5	0
14	1.8	3.05	0	0	0	1.8	2.5	3.05

Pin No.	I/O	Active Level	Abbreviation	Function
40	I	Pulse	CAPST.FG	Capstan FG (CAPST.FG) pulse input. Used to control the capstan motor.
41	I	-	Vcc (SRV)	Connected to 5V.
42	I	-	Vcc (OSD)	Connected to 5V.
43	I	-	C.VIDEO IN	Video signal input.
44	O	-	V.REF	Reference voltage of analog circuits.
45	O	-	C.VIDEO OUT	Video signal output.
46	-	-	CHARA. BIAS	Not used.
47	-	-	AFC LPF	An LPF is attached externally for AFC.
48	-	-	AFC OSC	Oscillator for AFC.
49	-	-	GND	Ground.
50	I	Pulse	DOSC IN	OSD dot clock oscillator.
51	O	Pulse	DOSC OUT	
52	O	-	2 fsc (7.16MHz)	These generate a 7.16MHz signal as the clock signal for the OSD and servo circuit.
53	I	-	2 fsc (7.16MHz)	
54	I	Pulse	C.SYNC/S.REF	VHS: Composite sync signal input. Controls the cylinder speed during analog recording. D-VHS: Servo reference signal input. Controls the cylinder speed during digital recording and playback.
55	O	Hi	BLUE BACK	Blue background control signal output.
56	O	Hi	Hi-Fi MUTE	Hi-Fi audio muting control output during recording.
57	O	Pulse	DATA(M-YC/LA)	Common communication lines with VIDEO/LINEAR AUD. ICs; data is transferred, synchronized with the clock signal.
58	O	Pulse	CLOCK(M-YC/LA)	
59	O	Lo	PB(L)	Sets the video/audio circuits to the playback mode.
60	O	Hi	REVERSE	Sets the drive direction of the capstan motor to reverse.
61	O	Hi	REC (AUDIO)	Sets the audio circuit to the recording mode.
62	I	Pulse	CTL RESET	Applies reset pulses to the CTL amp during slow and reverse slow play.
63	O	Hi	DIGITAL/ ANALOG(L)	Sets to the digital recording/playback mode.
64	O	Hi	D. LED	Causes the D-VHS LED to light. The D-VHS LED lights during digital recording/playback.
65	O	Hi	UNLOAD	Loading motor drive signals which set the mechanism to the commanded mode.
66	O	Hi	LOAD	
67	I	Pulse	I2C TIMING	Shows the timing of communications with the digital circuits.
68	-	-	TEST	Ground
69	I	-	X 2(32kHz)	These generate a 32.768kHz signal as the clock signal for the VCR's clock.
70	O	-	X 1(32kHz)	
71	-	-	GND	Ground
72	I	-	OSC 1(10MHz)	These generate a 10MHz signal as the system clock signal in modes other than back-up.
73	O	-	OSC 2(10MHz)	
74	O	Hi	LINE MUTE	Audio output muting control.
75	O	Hi/Lo	CAPST. Q.R	Cylinder and capstan motor phase control outputs.
76	O	Hi/Lo	CYL. Q.R	
77	O	Hi	POWER CONT	Power on/off control. When the power switch is operated, a cassette is inserted or a power failure is detected, the internal power supply is switched to be on/off.
78	O	Lo	SP(L)	Tape speed output.
79	O	Hi	V.REC MUTE	Video signal record muting control. Prevents the signal from being supplied to the video heads.
80	O	Hi	LM CONT.	Signal to control the voltage applied to the loading motor when forward slow is switched to reverse slow and vice versa.
81	O	Hi	MTS MUTE	Tuner audio muting control.
82	I	Pulse	IR PULSE	Receives the remote control code from the infrared receiver and sets the VCR to the specified mode.
83	O	Lo	LCD LOAD (L)	LOAD signal between the M-uP and LCD driver.

Pin No.	I/O	Active Level	Abbreviation	Function
84	I	Lo	REQUEST	Communication request signal from the CEBus uP.
85	I	Lo	REW END (L)	When "Lo" is input from the mechanism sensor, the current mode is released. Two sensors detect the two ends of tape. When "Lo" is input from both sensors, the M-uP detects that a cassette is not loaded in the VCR.
86	I	Lo	FWD END (L)	
87	I	Pulse	D. DET	C.SYNC input. Discriminates between analog and digital playback.
88	I	Pulse	T.REEL	Calculates the period of the take-up reel pulse to detect whether or not slack tape is taken up on the reel. If slack tape is not taken up, the M-uP stops the mechanism. The supply reel pulses are used with the take-up reel pulses to calculate the tape remaining time.
89	I	Pulse	S.REEL	
90	I	Lo	CHECK	Checks short-circuits in the 5V/9V power supplies. (This pin goes "Lo" normally when power is off.)
91	O	Hi	ST/SAP OUT	Output to control the MTS decoder so it is set to the SAP mode.
92	I/O	Pulse	DATA (M-R/HA/D)	Common communications lines with the ROM/Hi-Fi AUD/DIGITAL MODULE; data is communicated, synchronized with the clock signal.
93	O	Pulse	CLOCK (M-R/HA/D)	
94	O	H/L	V.CAPST CONT.	This is output in the slow, still, playback, recording, fast forward and rewind modes to control the voltage applied to the capstan motor. Lo: 13.5V, Mid: 9.5V, Hi: 7.5V
95	O	Pulse	CLOCK (M-TU)	Communication lines with the U/V TUNER; data is transferred, synchronized with the clock signal.
97	O	Pulse	DATA (M-TU)	
96	I	Lo	L.THROUGH (L)	Switching signal which outputs the LINE-1 input signal directly to LINE OUT during digital recording/playback.
98	O	Pulse	CLOCK (M-LCD/CE)	Communication lines with the LCD DRIVER/CEBus-uP; data is transferred, synchronized with the clock signal.
100	O	Pulse	DATA (M-LCD/CE)	
99	I	Pulse	DATA (M-CE)	

3. CEBus uP (IC3208)

Pin No.	I/O	Active Level	Abbreviation	Function
1	I	-	-	Not used.
2	I	-	VDD	Power supply
3	I	-	-	Not used (with a pull-up resistor).
4	I	-	-	Not used (with a pull-up resistor).
5	I	-	-	Not used (with a pull-up resistor).
6	I	-	-	Not used (with a pull-up resistor).
7	I	-	-	Not used (with a pull-up resistor).
8	I	-	-	Not used (with a pull-up resistor).
9	I	-	-	Not used (with a pull-up resistor).
10	I	-	-	Not used (with a pull-up resistor).
11	I	-	Vss	Ground
12	I	-	NDLY	uP test pin (fixed at VDD)
13	I	Lo	RESET-B	Reset input (reset at "Lo")
14	I	-	OSC1	For the connection of an external oscillator
15	O	-	OSC2	
16	I	-	-	Not used.
17	I	-	-	Not used.
18	I	-	-	Not used.
19	I	-	-	Not used.
20	I	-	-	Not used.
21	I	-	-	Not used.
22	I	Hi	DIG/ANA-B	Digital / Analog input (set to "Hi" during digital recording / playback)
23	I	Lo	PB-B	Playback input (set to "Lo" during playback)
24	I	Pulse	DATA IN	Communication data input from the Main uP
25	O	Pulse	DATA OUT	Communication data output to the Main uP
26	I	Pulse	CK IN	Input of clock for communications with the Main uP
27	I	Pulse	CEBus IN	CEBus communication input
28	I	Pulse	CEBus IN	
29	O	Pulse	CESus OUT	CEBus communication output
30	O	Lo	REQUEST	Output to request the Main uP to start communications.
31	I	Lo	CS IN	Chip select input for communications with the Main uP.
32	I	-	VDD	Power supply
33	I	-	-	Not used.
34	I	-	-	Not used.
35	I	-	-	Not used.
36	I	-	-	Not used.
37	I	-	-	Not used.
38	I	-	-	Not used.
39	I	-	-	Not used.
40	O	Lo	DIMRST-B	Output to reset the digital signal processor LSI (set to "Lo" when reset).
41	O	Lo	VIMRST-B	Output to reset the Vitabi decoder LSI (set to "Lo" when reset).
42	I	-	-	Not used (with a pull-up resistor).
43	I	-	-	Not used (with a pull-up resistor).
44	I	-	-	Not used (with a pull-up resistor).
45	I	-	-	Not used (with a pull-up resistor).
46	I	-	-	Not used (with a pull-up resistor).
47	I	-	-	Not used (with a pull-up resistor).
48	I	-	-	Not used (with a pull-up resistor).
49	I	-	-	Not used (with a pull-up resistor).
50	I	-	-	Not used.
51	I	-	-	Not used.
52	I	-	-	Not used.

MEMO

CHAPTER 7 TROUBLE DISPLAY AND TROUBLESHOOTING

Trouble Display Function

This VCR has a function which displays mechanism malfunctions, etc. in the LCD display. Use this function to analyze the cause when the power is shut off due to a malfunction, etc. in the mechanism. Two types of information are displayed, (1) The operation mode when the malfunction has occurred, (2) Malfunction Codes.

The details of the malfunction are displayed as follows:

Procedure to display a malfunction

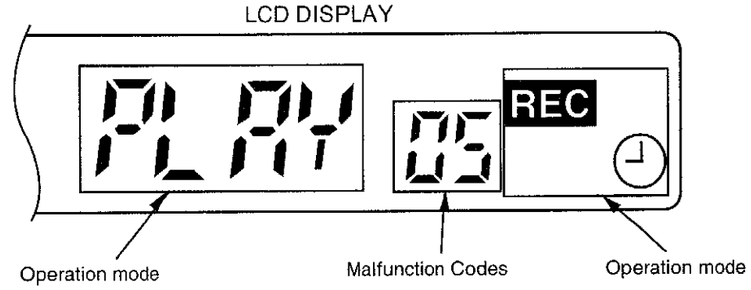
Press the "CHANNEL ▼ " button on the VCR when the power is turned off and hold it; the malfunction code is displayed while the button is held depressed.

Procedure to clear the malfuntion display

Press the "PLAY" button on the VCR and hold it, then press the microprocessor "RESET" button to initialize the trouble display.

* Hold the "PLAY" button depressed and release it after the display lights.

LCD DISPLAY



[Display of Details of Malfunction]

Displayed No.	Item	Details
00	No malfunction	
01	FL mechanism lock	Malfunction in insertion/ejection of cassette
02	Capstan lock	Malfunction of capstan motor drive during tape unloading
04	Reel lock	Reel rotation trouble when tape is running
05	Cylinder lock	Cylinder rotation malfunction
07	Loading mechanism lock	Malfunction in shifting mechanism mode
16	Servo lock	Shorting of 5V detected

[Mode Display when Malfunction Has Occurred]

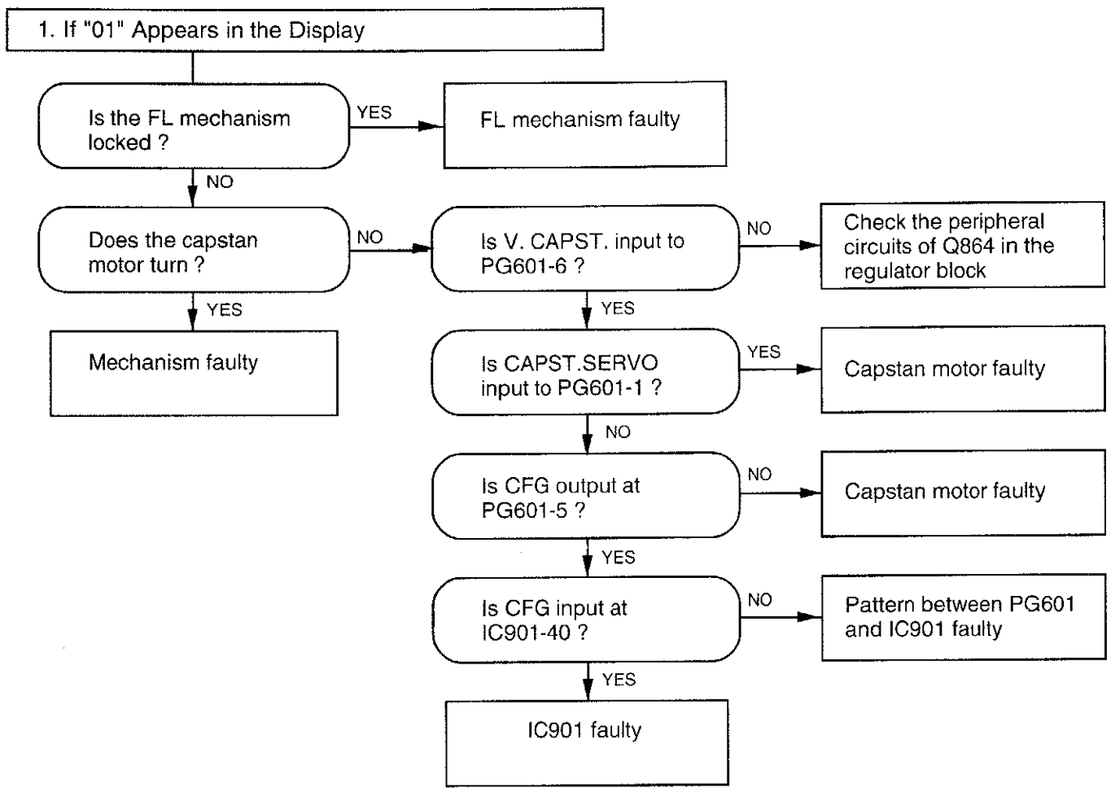
Mode	Display
Stop	No display
Fast forward	**FF**
Rewind	**REW**
Recording	**REC**
Timer recording	◷ **REC**
Recording pause	**REC** (flashes)

Mode	Display
Playback	**PLAY**
Forward search	**SRCH**
Reverse search	**-SRCH**
Slow	**SLOW**
Still play	**STILL**
Reverse slow	**-SLOW**

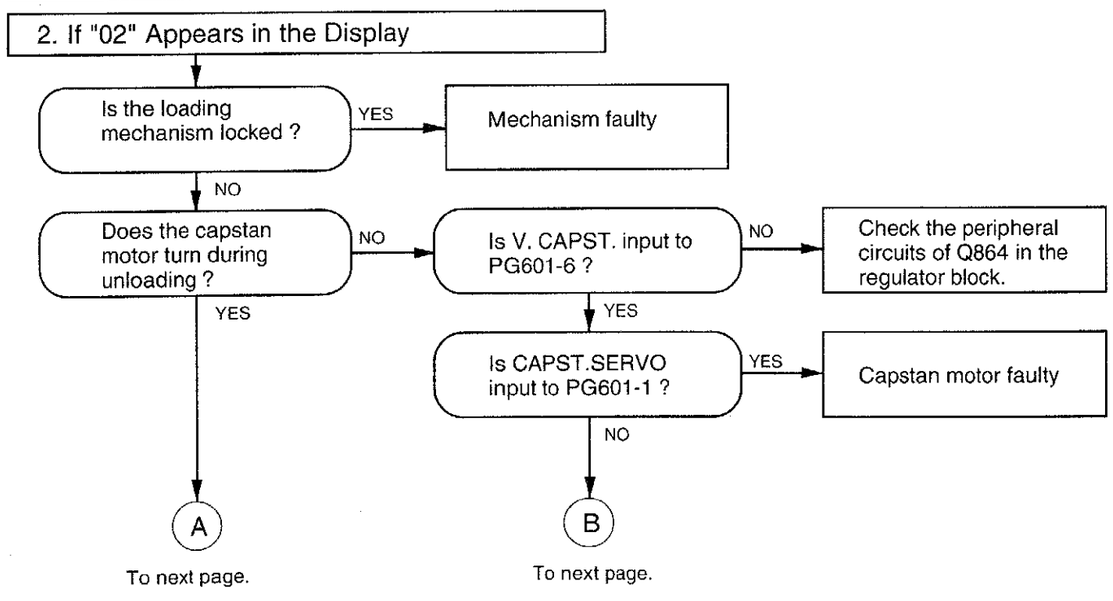
No symbols are displayed if the malfunction occurred when a cassette was inserted or ejected, or the power was switched on from off, and off from on.

Troubleshooting According to Malfunction Display

1. If "01" Appears in the Display



2. If "02" Appears in the Display



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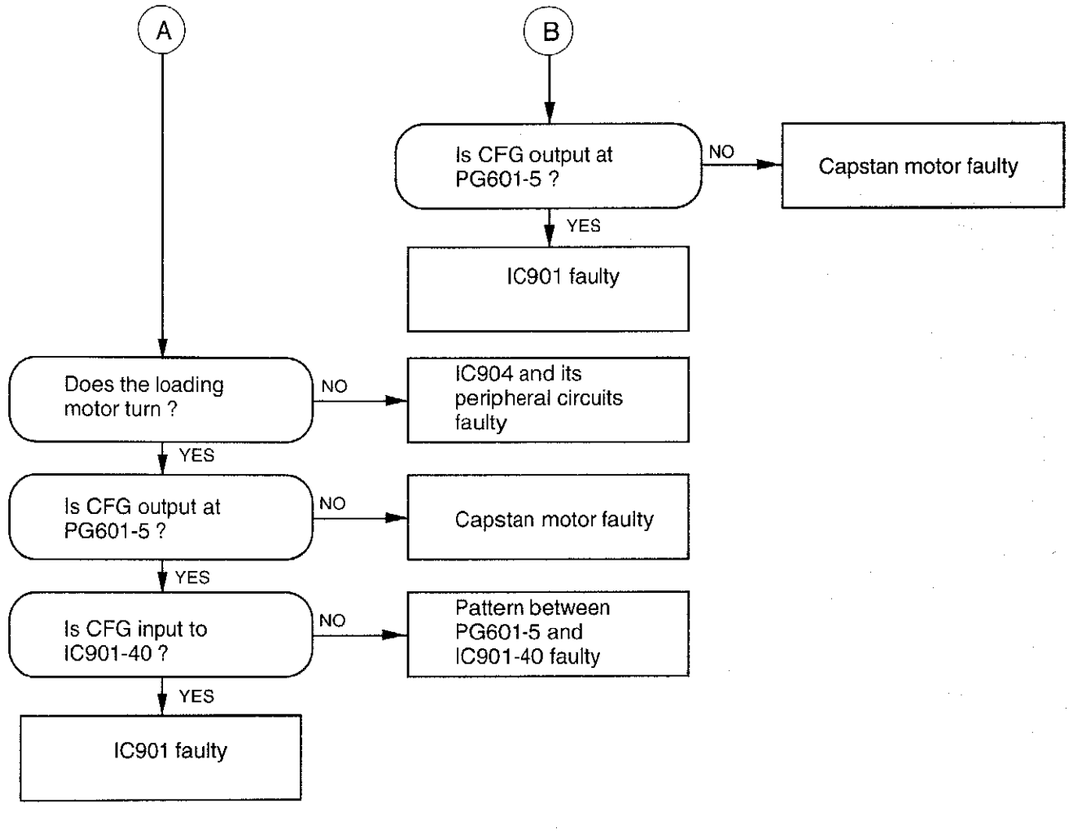
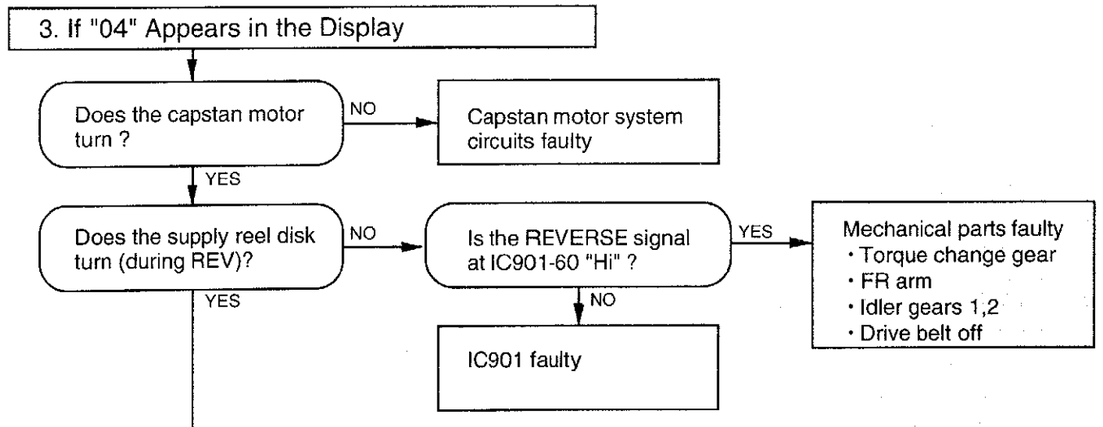


3. If "04" Appears in the Display



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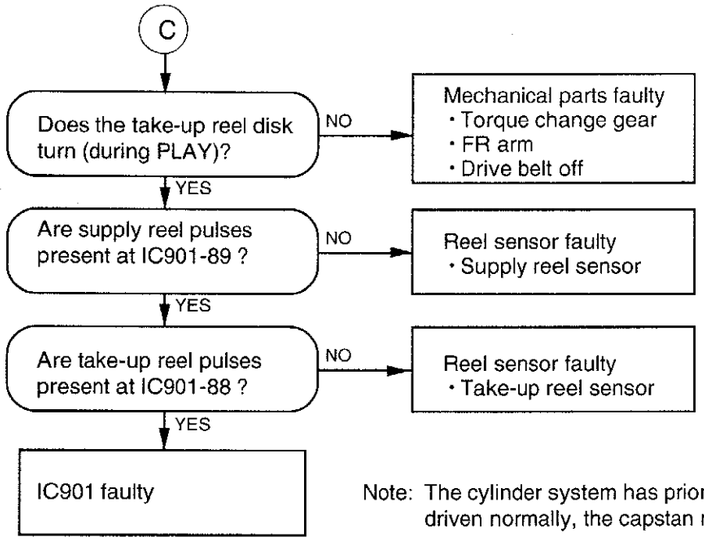
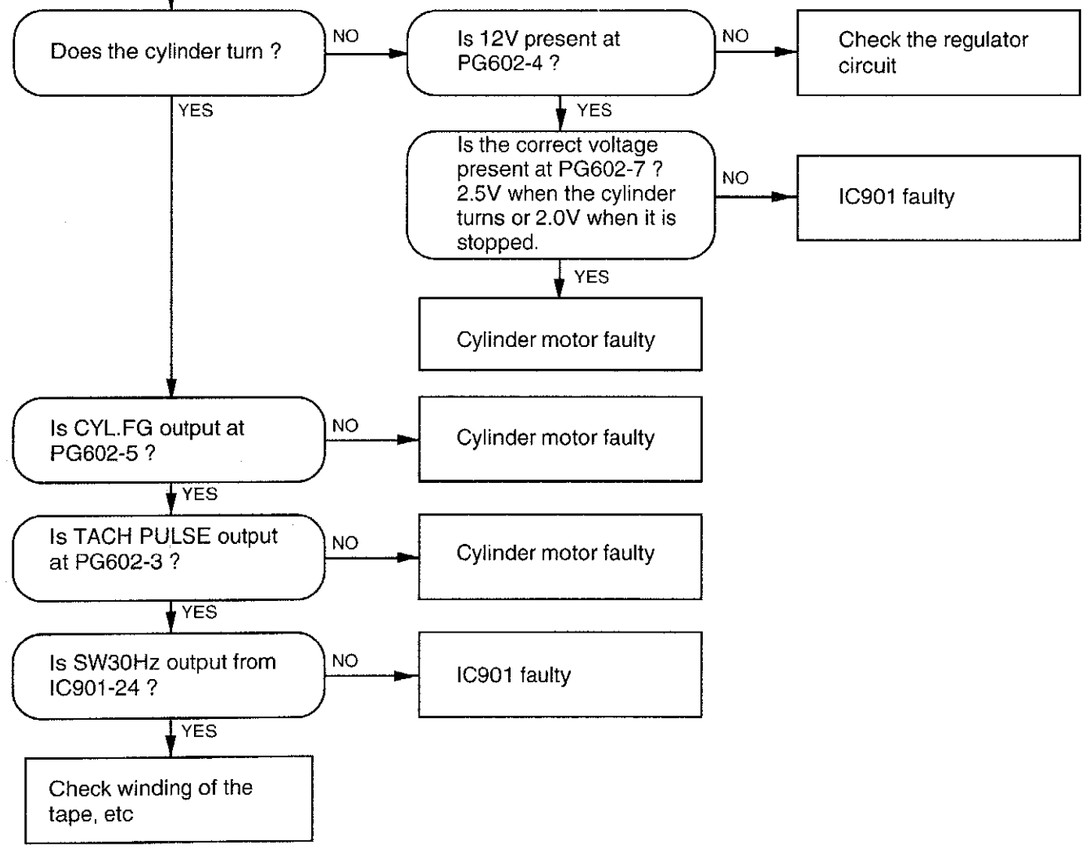
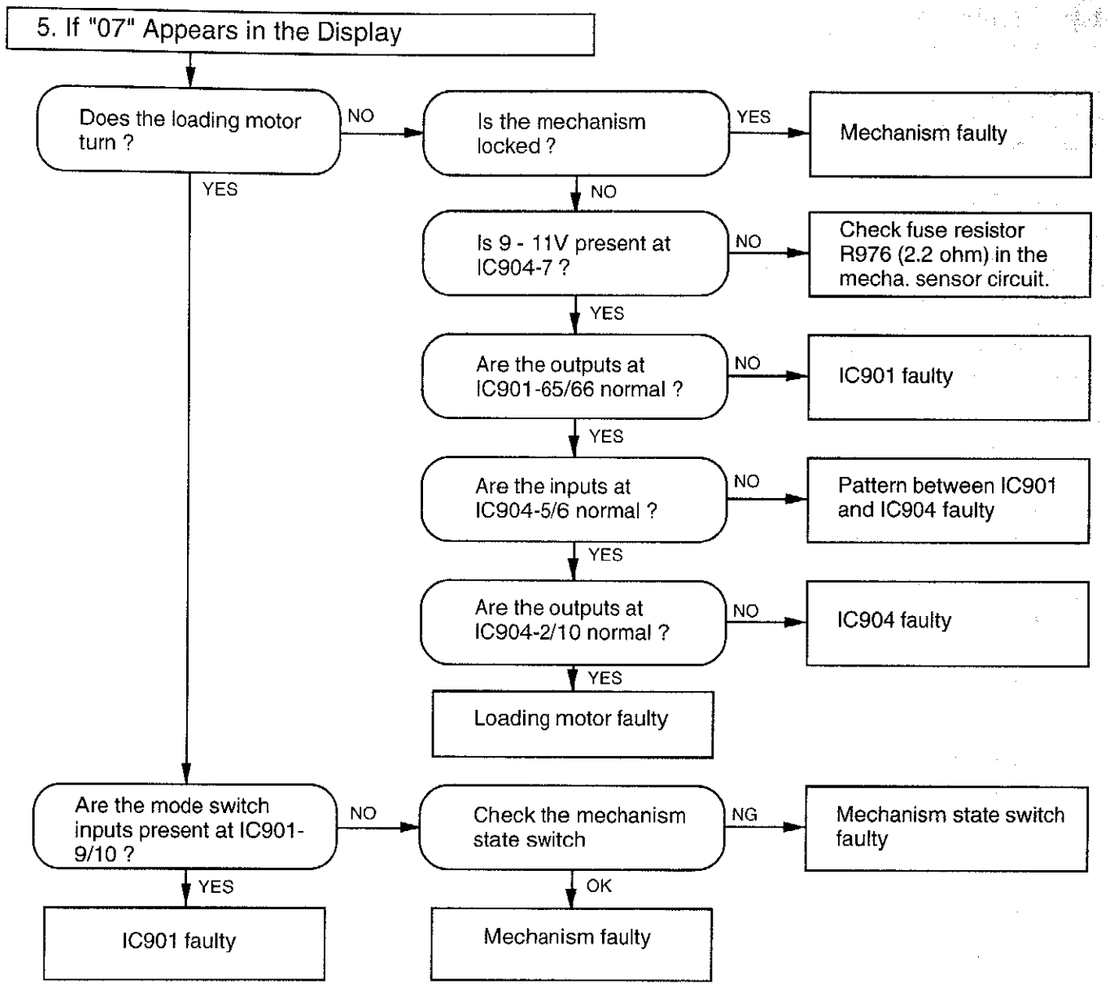


Note: The cylinder system has priority. If the cylinder motor is not driven normally, the capstan motor will not be driven.

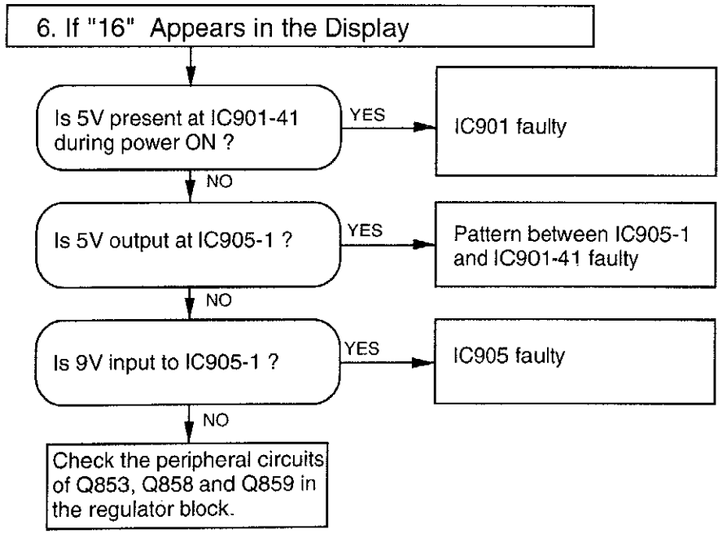
4. If "05" Appears in the Display



5. If "07" Appears in the Display



6. If "16" Appears in the Display



Troubleshooting the Switching Regulator

This section summarizes the troubleshooting of defects in the switching regulator. Perform diagnosis, taking each defective phenomenon into consideration. Even if the same defective phenomenon appears, it may be caused by other circuits, not by the switching regulator, so use this item as a reference.

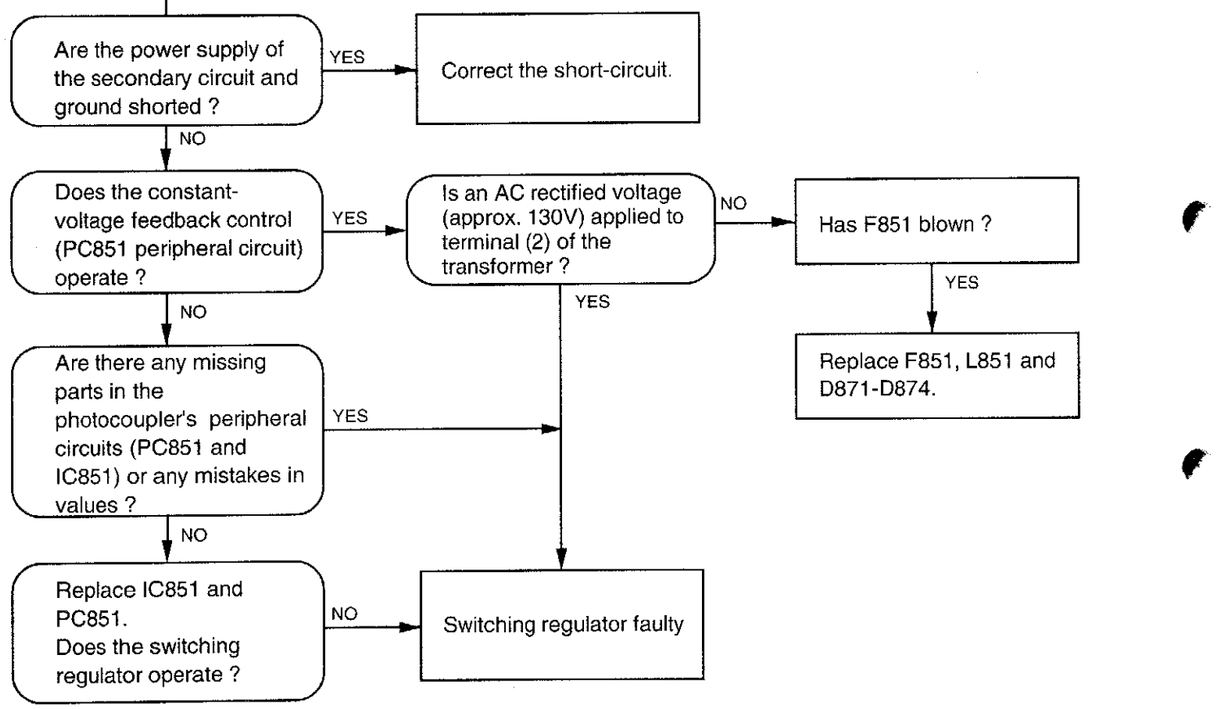
Cautions when checking and repairing the switching regulator circuit

When using test equipment to check the primary circuit (circuit No. 8XX) of the power supply, use a two-pole AC outlet for the test equipment (attach a conversion adapter to the test equipment plug to connect it to a three-pole outlet).

Be careful of electric shock

A heat sink which generates a high voltage is provided with IC851 in the switching regulator block. "HIGH VOLTAGE" is printed on the heat sink. Take great care of this section when servicing or handling the VCR when it is turned on. (Supplement: The heat sinks of Q853 and Q864 do not generate a high voltage.)

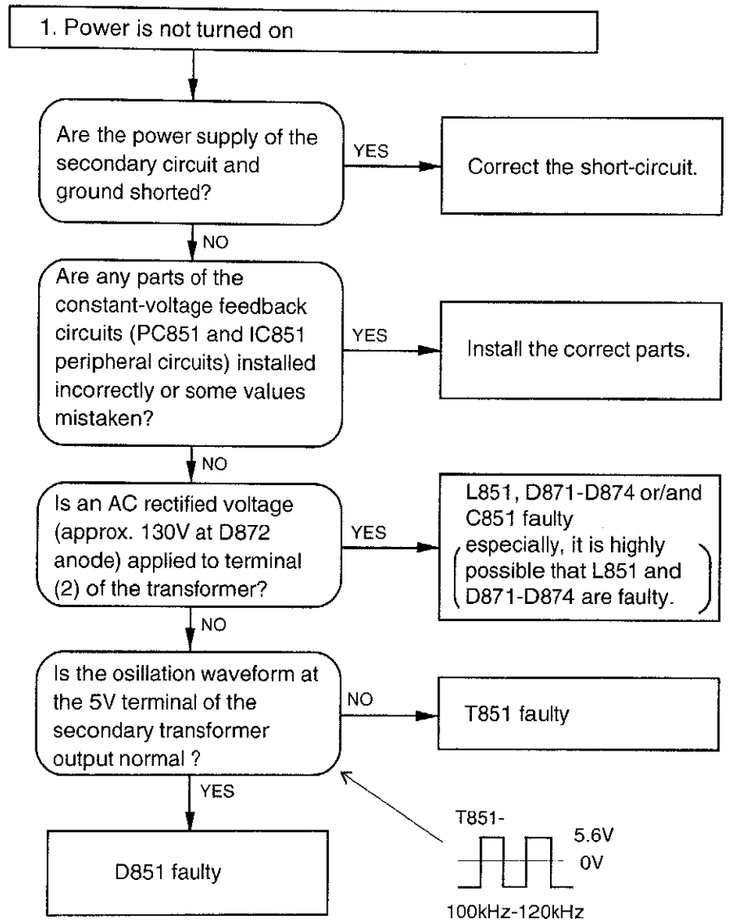
Method to judge that the switching regulator is faulty


Are the power supply of the secondary circuit and ground shorted ?
YES
Correct the short-circuit.
NO
Does the constant-voltage feedback control (PC851 peripheral circuit) operate ?
YES
Is an AC rectified voltage (approx. 130V) applied to terminal (2) of the transformer ?
NO
Has F851 blown ?
YES
Replace F851, L851 and D871-D874.
NO
Are there any missing parts in the photocoupler's peripheral circuits (PC851 and IC851) or any mistakes in values ?
YES
NO
Replace IC851 and PC851. Does the switching regulator operate ?
NO
Switching regulator faulty

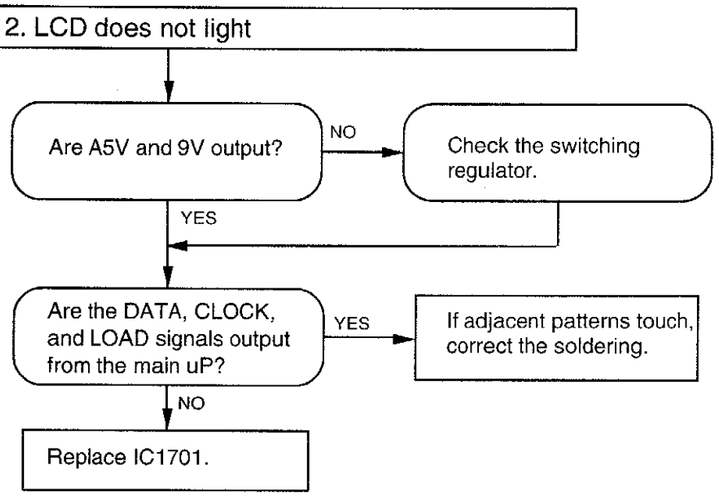
Troubleshooting by Observing Defective Phenomena

If the switching regulator is normal and there is a defect in another circuit (shorting between the power supply and ground of the secondary circuit), the protective function operates and the power is not turned on. If a defect occurs in the switching regulator, a phenomenon such that the VCR power is not turned on or the power fuse has blown also occurs.

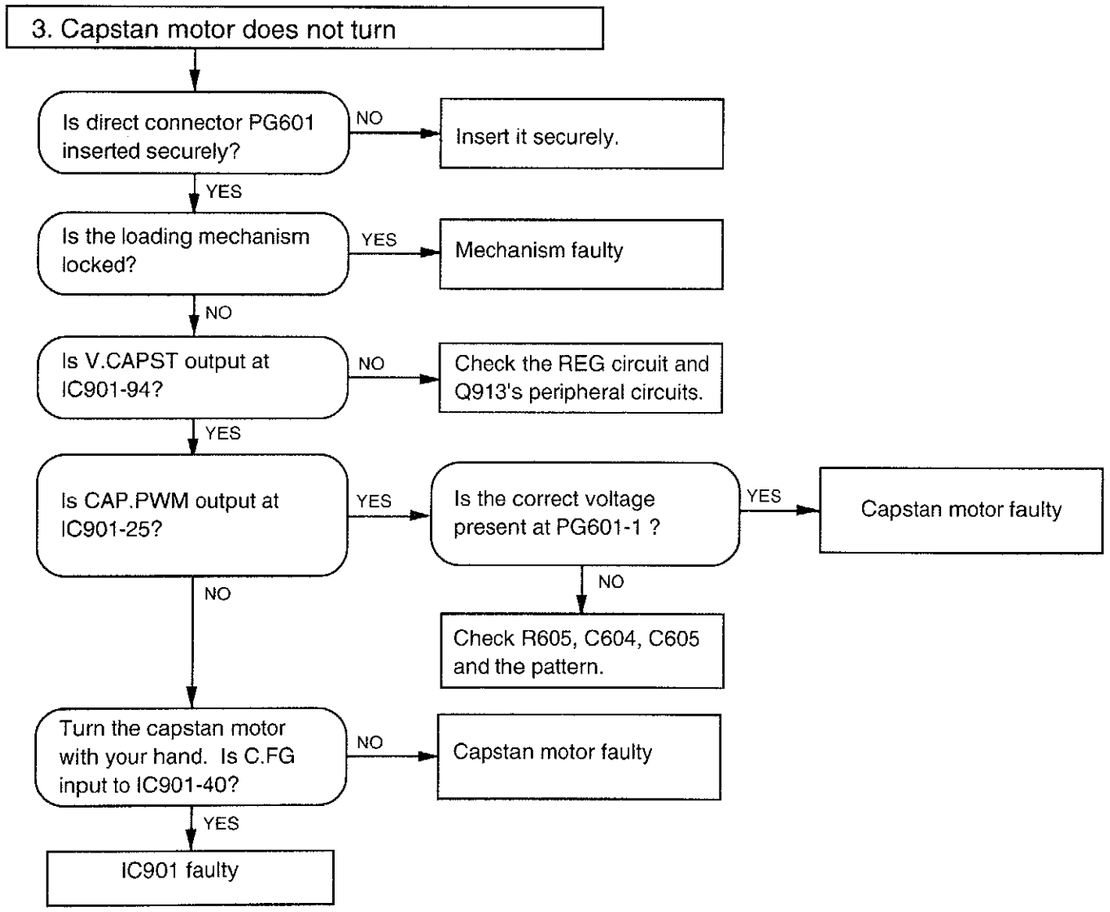
1. Power is not turned on


Are the power supply of the secondary circuit and ground shorted?
YES
Correct the short-circuit.
NO
Are any parts of the constant-voltage feedback circuits (PC851 and IC851 peripheral circuits) installed incorrectly or some values mistaken?
YES
Install the correct parts.
NO
Is an AC rectified voltage (approx. 130V at D872 anode) applied to terminal (2) of the transformer?
YES
L851, D871-D874 or/and C851 faulty
especially, it is highly possible that L851 and D871-D874 are faulty.
NO
Is the osillation waveform at the 5V terminal of the secondary transformer output normal ?
NO
T851 faulty
YES
D851 faulty
T851-
5.6V
0V
100kHz-120kHz

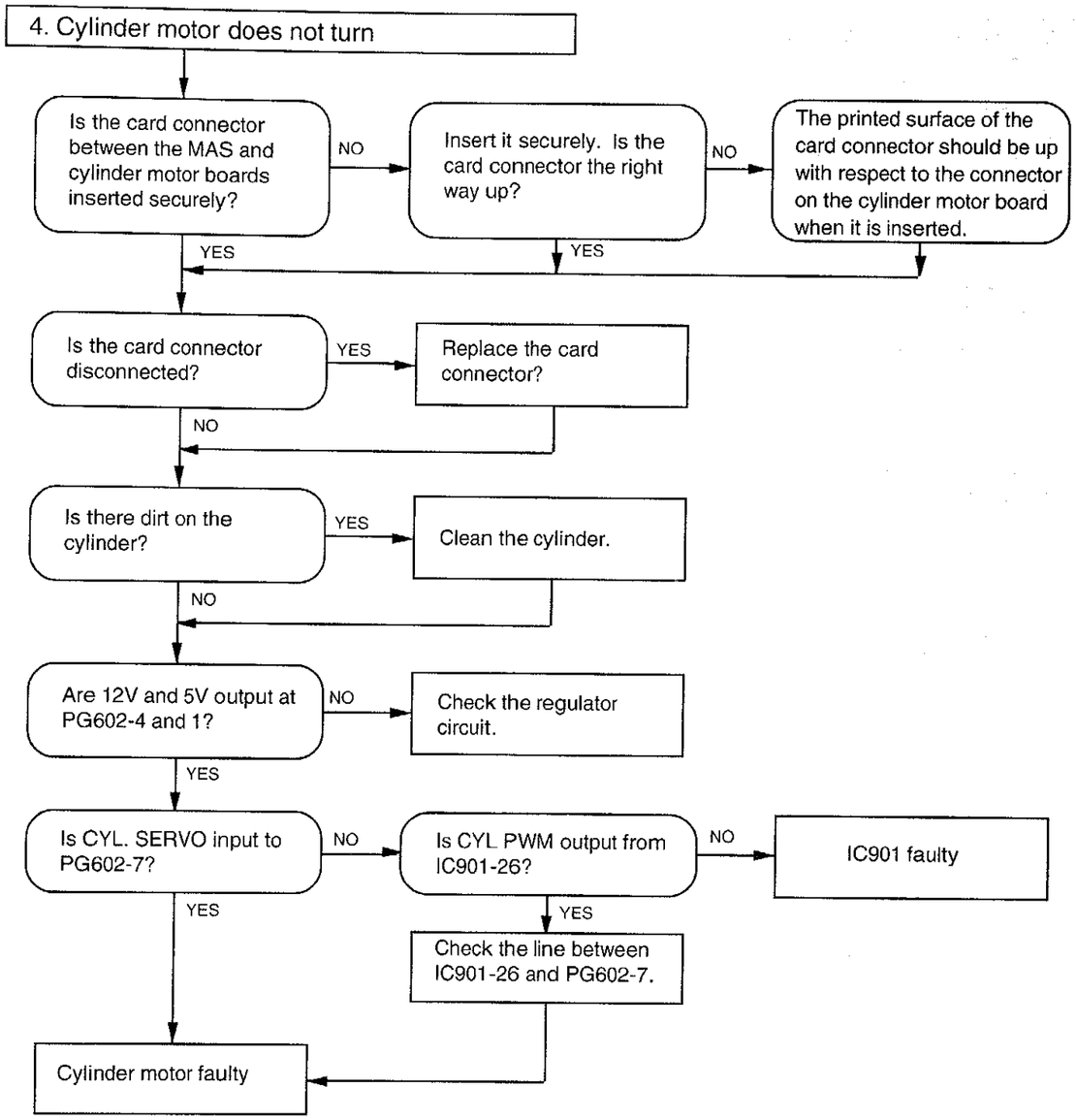
2. LCD does not light

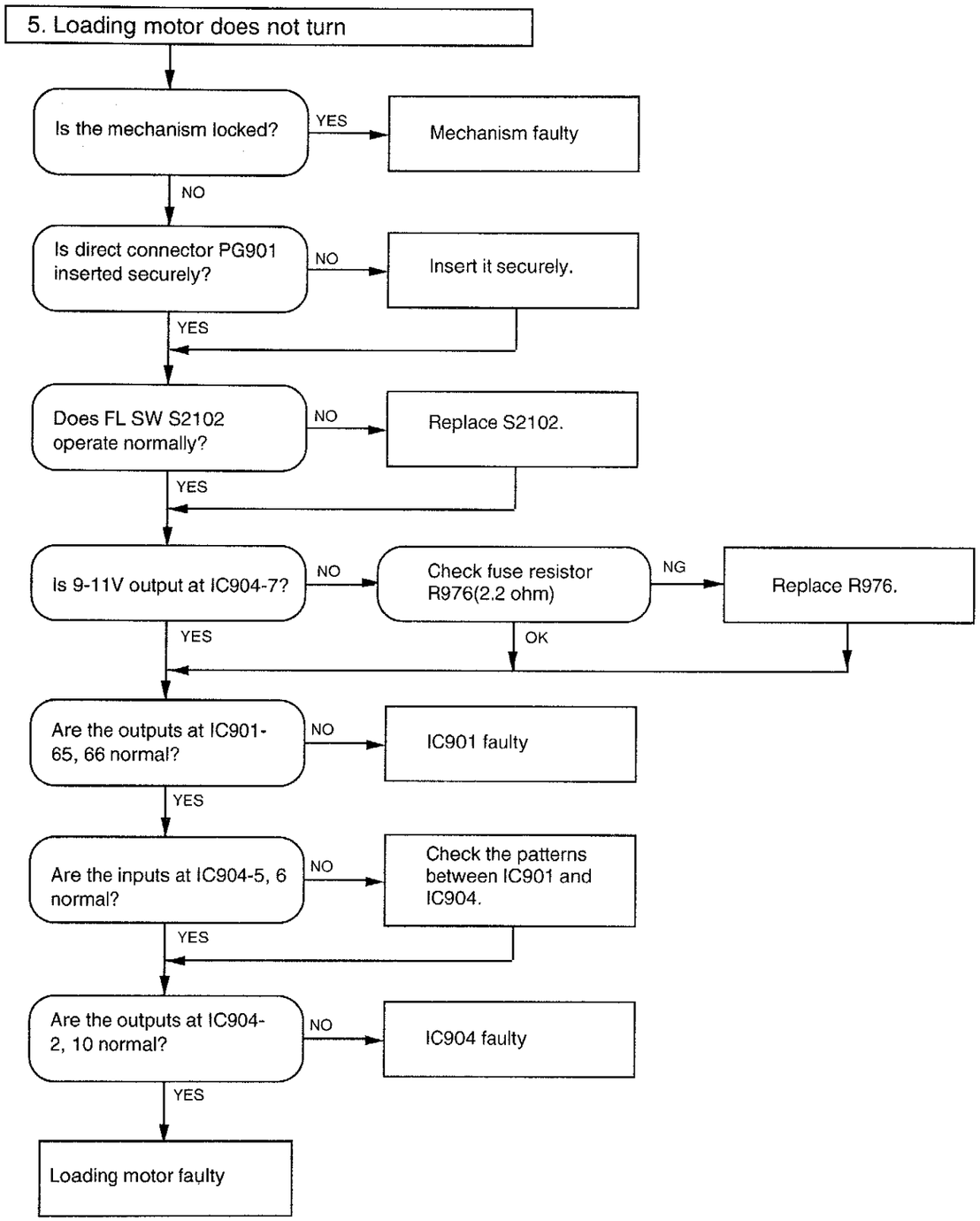


3. Capstan motor does not turn



4. Cylinder motor does not turn


Is the card connector between the MAS and cylinder motor boards inserted securely?
NO
Insert it securely. Is the card connector the right way up?
NO
The printed surface of the card connector should be up with respect to the connector on the cylinder motor board when it is inserted.
YES
YES
YES
Is the card connector disconnected?
YES
Replace the card connector?
NO
Is there dirt on the cylinder?
YES
Clean the cylinder.
NO
Are 12V and 5V output at PG602-4 and 1?
NO
Check the regulator circuit.
YES
Is CYL. SERVO input to PG602-7?
NO
Is CYL PWM output from IC901-26?
NO
IC901 faulty
YES
YES
Check the line between IC901-26 and PG602-7.
YES
Cylinder motor faulty


5. Loading motor does not turn
Is the mechanism locked?
YES
Mechanism faulty
NO
Is direct connector PG901 inserted securely?
NO
Insert it securely.
YES
Does FL SW S2102 operate normally?
NO
Replace S2102.
YES
Is 9-11V output at IC904-7?
NO
Check fuse resistor R976(2.2 ohm)
NG
Replace R976.
YES
OK
Are the outputs at IC901-65, 66 normal?
NO
IC901 faulty
YES
Are the inputs at IC904-5, 6 normal?
NO
Check the patterns between IC901 and IC904.
YES
Are the outputs at IC904-2, 10 normal?
NO
IC904 faulty
YES
Loading motor faulty

HITACHI

VT-DX815A

VT-DX815A

VT-DX815A TK No.4721E Image & Information Media Systems Division, Tokai

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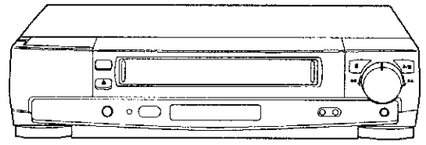
HITACHI

SERVICE MANUAL

TK | No.4721E-1

VT-DX815A

SUPPLEMENT



This service manual is to supplement the previous manual (No.4721E).
Some adjustment methods for the servo and digital circuits have been changed.
Use this manual to perform adjustment.
Also refer to the manuals listed below.

Manuals to be referred to;

Name of manual	Manual No.
VT-DX815A	4721E
US Mechanism	4527E

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3. Be careful of electric shocks 3-1

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D-VHS CTP2 NTSC

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

VIDEO CASSETTE RECORDER

May 1998 Image & Information Media Systems Division, Tokai

SAFETY PRECAUTIONS

NOTICE:
Comply with all cautions and safety related notes located on or inside the cabinet and on the chassis.

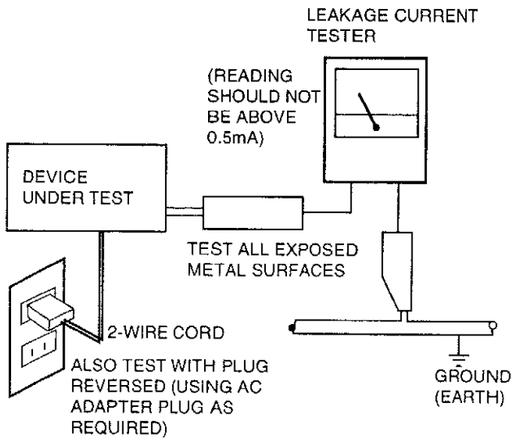
1. When replacing a chassis in the instrument, all the protective devices must be put back in place, such as barriers, non-metallic knobs, adjustment and compartment covers/shields, isolation resistors/ capacitors, etc.
2. When service is required, observe the original lead-dress. Extra precautions should be taken to assure correct lead dress in the high voltage circuit.
3. Always use the manufacturers' replacement components. Especially critical components as indicated on the circuit diagram should not be replaced by other manufacturer's. Furthermore, where a short-circuit has occurred, replace those components that indicate evidence of overheating.
4. Before returning an instrument to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the instrument by the manufacturer has become defective or inadvertently defeated during servicing. Therefore, the following checks should be performed for the continued protection of the customer and service technician.

Leakage Current Cold Check

With the AC plug removed from the AC120V, 60Hz source, place a jumper across the two plug prongs. Turn the AC power switch on. Using an insulation tester (DC500V), connect one lead to the jumpered AC plug and touch the other lead to exposed metal parts (antennas, screwheads, metal overlays, control shafts, etc.), particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistor reading of 0.3 Mohm and a maximum resistor reading of 5 Mohm. Any resistor value below or above this range indicates an abnormality which requires corrective action. Exposed metal parts not having a return path to the chassis will indicate an open circuit.

Leakage Current Hot Check

Plug the AC line cord directly into a AC120V, 60Hz outlet (do not use an isolation transformer for this check).
Turn the AC power switch on. Using a "Leakage Current Tester", measure for current from all exposed metal parts of the cabinet (antennas, screwheads, metal overlays, control shafts, etc.), particularly an exposed metal part having a return path to the chassis, to a known ground (earth) (water pipe, conduit, etc.). Any current measured must not exceed 0.5 mA.


LEAKAGE CURRENT TESTER
(READING SHOULD NOT BE ABOVE 0.5mA)
DEVICE UNDER TEST
TEST ALL EXPOSED METAL SURFACES
2-WIRE CORD
ALSO TEST WITH PLUG REVERSED (USING AC ADAPTER PLUG AS REQUIRED)
GROUND (EARTH)

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE UNIT TO THE CUSTOMER.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts have special safety-related characteristics. These are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for a higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual. Electrical components having such features are identified by marking with a ⚠ on the schematics and the parts list in this Service Manual. The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards. Product safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies for, HITACHI Service Manual may be obtained at a nominal charge from HITACHI SALES CORPORATION.

CHAPTER 3 ELECTRIC CIRCUIT ADJUSTMENT

Service Position

1. Servicing position during electrical adjustment

Perform adjustment after removing the top cover, front panel and rear panel.

When the shield cover of the connector between the cylinder motor and MAS boards is removed, noise appears in the playback picture. Attach the shield cover when checking the picture on the screen.

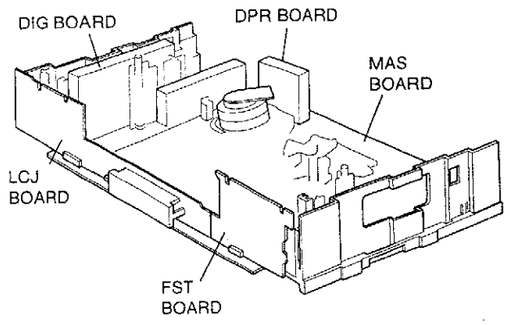


Fig. 1

2. Servicing positions when repairing and checking circuits

2-1. Procedure to set the LCJ and FST boards to the servicing positions (Fig. 2)

1) Remove the top cover and front panel.
2) Remove the DJK board.
3) Remove the rear panel.
4) Remove the US-FL mechanism.
5) Remove the front piece.
6) Open each board as shown in the figure below and perform checks from the pattern sides indicated by the arrows.

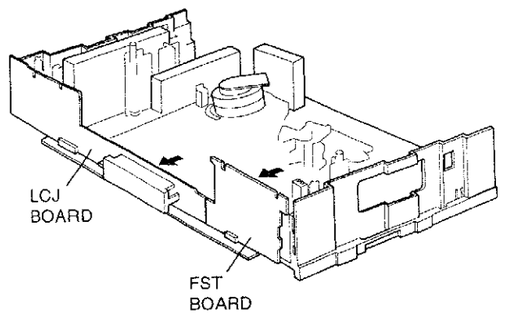


Fig. 2

2-2. Procedure to set the MAS board to the servicing position (Fig. 3)

1) Remove the top cover and front panel.
2) Remove the DJK and DIG boards.
3) Remove the rear panel.
4) Remove the US-FL mechanism and front piece.
5) Remove the MAS board, with the LCJ and FST boards and US mechanism assembled from the frame.
6) Turn over the MAS board and perform checks from the pattern side indicated by the arrow.

Note the following two points at this time:
1) Lay an insulation sheet under the boards.
2) Attach the shield cover at the rear of the cylinder. Attach the US-FL mechanism when loading the tape.

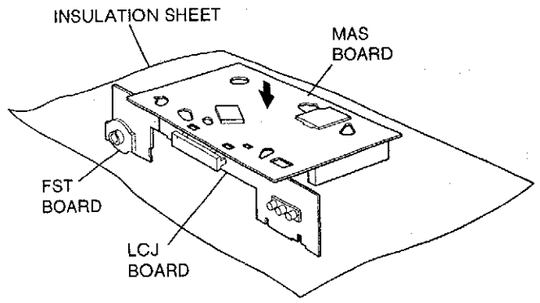


Fig. 3

3. Be careful of electric shocks

The power supply block on the right of the VCR has a heat sink which generates a high voltage. "HIGH VOLTAGE" is printed on the heat sink.
Take great care when handling this heat sink when the power is turned on during servicing.

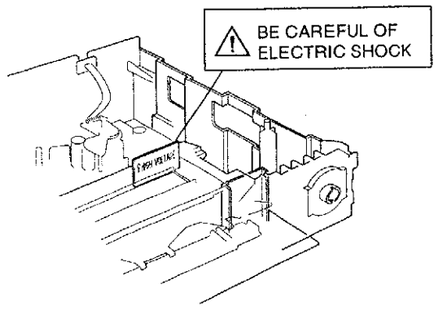


Fig. 4

Electrical Circuit Adjustment

1. Test equipment/jigs necessary for adjustment

1) Dual-trace oscilloscope
2) Color bar generator
3) Voltmeter
4) Frequency counter
5) Monitor TV (with A/V jacks)
6) Alignment tapes:
   NTSC tape : Part No. 7099046
   30HMP2-1 : Part No. 7099089
   24HMAF-2 : Part No. 7099153
   (Hi-Fi alignment tape)
   NTSC-CTP2 (D-VHS alignment tape)
7) Blank tapes (VHS/D-VHS or S-VHS)
8) C/R oscillator

2. Cautions on adjustment

1) The following conditions apply when otherwise not specified:
   Probe of oscilloscope: 10:1
   Synchronization of oscilloscope: Internal sync
   Ground of test equipment: PG2508 pin 6
   (on MAS board)
2) When performing more than one adjustment, follow the specified order.

3. Tips for adjustment

3-1. Procedure to reset the main microprocessor

The main microprocessor is not reset even when the power cord is unplugged from the AC outlet because its power is backed up by a backup circuit. Press S1719 on the LCJ board to reset all the microprocessors.
Do not press the reset switch with the power cord unplugged from the AC outlet as the slow tracking preset value could drift. If the preset value drifts, plug the power cord into an AC outlet and press the reset switch again with the power turned on. It is recommended that you press the reset switch after reinstalling the front panel.

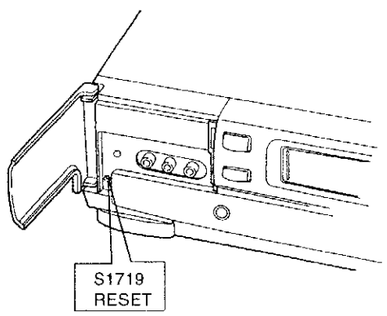


Fig. 5

3-2. Procedure to switch off the blue background function

1) Press the "GUIDE" button of the remote control to display the menu on the monitor TV screen.
2) Press "2" to select the VCR setup screen.
3) Press "1" to specify blue background off.

3-3. Procedure to obtain the EP head playback mode (X-value adjustment test mode)

Press the "1" and "4" buttons of the remote control provided simultaneously when an alignment tape is being played and hold them, then press the "CHANNEL ▽" button on the VCR; The VCR enters the EP head playback mode (X-value adjustment test mode).
Check that "**TEST**" appears in the LCD display.

4. Connections of test equipment

Connect the test equipment as follows when otherwise not specified:

1) Connect a color bar generator to the video input 1 jack of the VCR.
2) Connect a monitor TV to the video output jack of the VCR.
3) Connect a monitor TV (able to handle a stereo signal) to the audio output jack.
4) Connect an antenna to the antenna jack and receive a TV broadcast (only for sound multiplex adjustment).

Caution when setting to the test mode

The remote control provided with VT-DX815A does not have a function that sets tracking to the center. Using a remote control of another model VCR, simultaneously press the "1" and "4" buttons of the remote control, so that tracking is set to the center and the test mode is set.
This manual explains that the command to set tracking to the center and set the VCR to the test mode is issued when "1" and "4" buttons of the remote control are pressed simultaneously. However, the command is different for each model, so be sure to check the service manual of the remote control being used.

5. Test Points and Adjustment Points

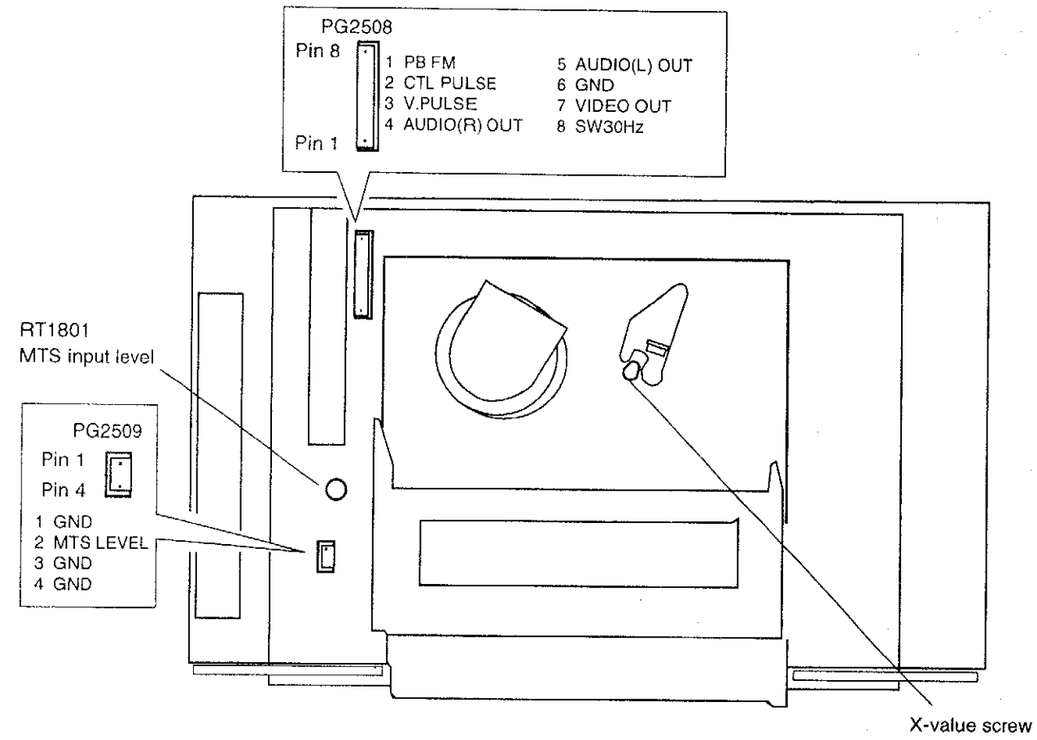


Fig. 6 MAS (Main) Circuit Board [Components Side]

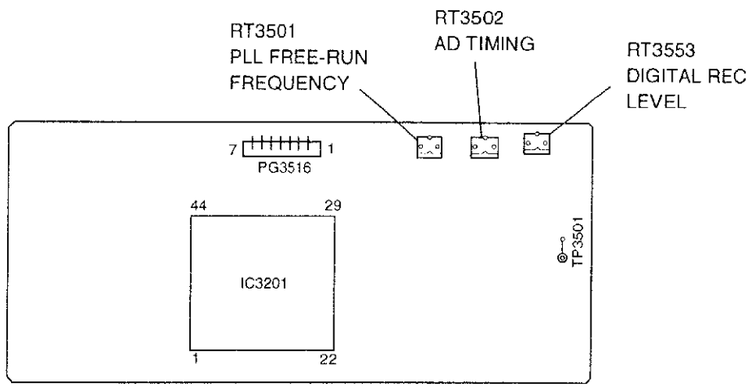


Fig. 7 DIG (Digital) Circuit Board [Components Side]

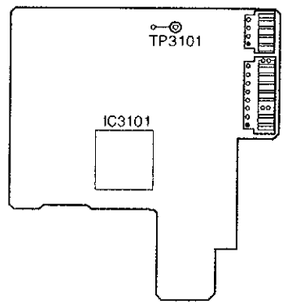


Fig. 8 DPR (Digital Preamp) Circuit Board [Components Side]

6-1. X-value adjustment (Fig. 6)

Purpose:
To ensure compatibility with other VCRs.

Fault due to incomplete adjustment:
When a tape recorded by another VCR is played back, the tracking is not optimized and noise appears on the screen.

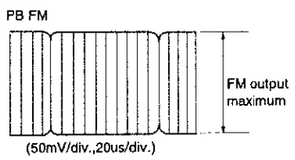
Test Equipment/Jigs and Connection Points
Oscilloscope CH-1: PG2508-1 (PB FM)
CH-2: PG2508-8 (SW30Hz)
Alignment tape (30HMP2-1)

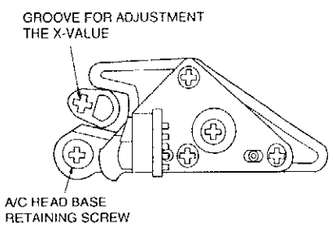
State of VCR
1) Play the alignment tape.
2) Set to the X-value adjustment test mode.

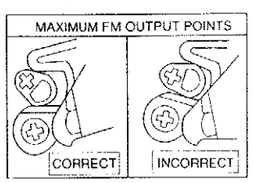
Adjustment Point
Groove for adjustment the X-value

Adjustment Procedure
1) Play the alignment tape.
2) Press the "1"and "4" buttons of the remote control provided simultaneously and hold them, then press the "CHANNEL ▽ "(S2709) button of the VCR to set the VCR to the test mode. (Check that "TEST" appears in the display.)
3) Loosen the screw holding the A/C head base (do not loosen it excessively).
4) Insert a screwdriver into the groove for adjusting the X-value and adjust so the FM output is maximum. There are two maximum FM output points when the groove for adjusting the X-value is turned. Adjust the FM output to a maximum when the groove is at the correct position as shown in the figure below.
5) Press the "STOP" button to release the test mode.

Waveforms







There are two switching point adjustment procedures; analog adjustment using a 30HMP2-1 alignment tape, and digital adjustment using a D-VHS alignment tape. Select either adjustment procedure according to the alignment tape available.

6-2. Switching point adjustment [Analog adjustment] (Fig. 6)

Purpose:
To set the switching point of the video heads during playback to the center where the CH-1 and CH-2 envelopes overlap each other.

Fault due to incomplete adjustment:
Vertical sync signal is degraded and vertical jitter occurs.
Switching noise appears across the bottom of the screen.

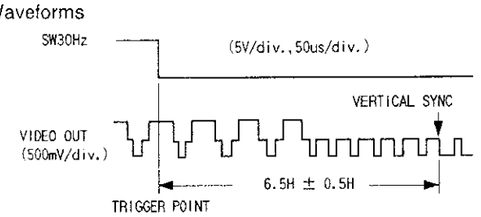
Test Equipment/Jigs and Connection Points
Oscilloscope CH-1: Video out jack
CH-2: PG2508-8 (SW30Hz)
Alignment tape (30HMP2-1)

State of VCR
1) Play the alignment tape
2) Set to the X-value adjustment test mode.

Adjustment Point
F.FWD button (remote control)
REW button (remote control)

Adjustment Procedure
1) Play the alignment tape.
2) Press the "1"and "4" buttons of the remote control provided simultaneously and hold them, then press the "CHANNEL ▽ "(S2709) button of the VCR to set the VCR to the test mode. (Check that "TEST" appears in the display.)
3) Press the "F.FWD"and "REW" buttons of the remote control so the phase from the vertical sync to the trailing edge (trigger position) of the SW30Hz pulse is set to 6.5H ± 0.5H.
4) Press the "STOP" button to release the test mode.

Waveforms



<Conditions of oscilloscope>
Trigger with CH-2.
Set the sync slope to "-".

After completing the switching point adjustment, readjust the digital recording level and AD timing in digital circuit adjustments.

6-3. Switching point adjustment [Digital adjustment] (Fig. 7)

Purpose:
To set the switching point of the video heads during playback to the center where the CH-1 and CH-2 envelopes overlap each other.

Fault due to incomplete adjustment:
Switching noise appears across the bottom of the screen.

Test Equipment/Jigs and Connection Points
Oscilloscope CH-1: TP3501 (PB OUT)
CH-2: PG3516-7 (SWH) [Trigger]
D-VHS alignment tape (NTSC-CTP2)

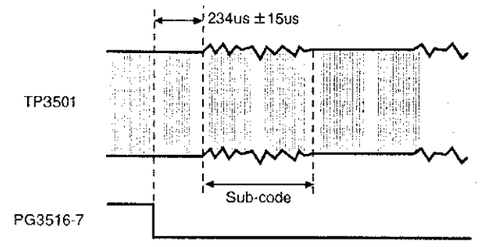
State of VCR
1) Play the D-VHS alignment tape
2) Set to the D-VHS dubbing mode.

Adjustment Point
F.FWD button (remote control)
REW button (remote control)

Adjustment Procedure
1) Load the VCR with a D-VHS alignment tape and set it to the stop mode.
Caution: Do not connect the digital A/V cable.
2) Holding down the "DSS/VCR" button of the remote control, press the "STOP" button of the VCR to set to the D-VHS dubbing mode. (The D-VHS LED will light and "dub" will appear in the diaplay.)
Caution: The D-VHS dubbing mode will be released when STOP, PLAY PAUSE, SEARCH, F.FWD, REW or POWER OFF is engaged.
3) Set the VCR to the playback mode.
4) Press the "1"and "4" buttons of the remote control provided simultaneously and hold them, then press the "CHANNEL ▽ "(S2709) button of the VCR to set the VCR to the test mode. (Check that "TEST" appears in the display.)
5) Press the "CHANNEL △ , ▽ " buttons of the VCR to maximize the TP3501 output amplitude.
Note: When the tracking up or down button is pressed, a two-digit number will appear in the channel indicator of the display. This represents the number of playback output level. If this number is maximized, the output level at TP3501 can be maximum.
6) Press the "F.FWD" and "REW" buttons of the remote control so that it is 234us ± 15us from the trailing edge of SWH waveform to the start of subcode.
7) Press the "STOP" button to release the test mode.

After completing the switching point adjustment, readjust the digital recording level and AD timing in digital circuit adjustments.

Waveforms



<Conditions of oscilloscope>
Trigger with CH-2.
Set the sync slope to "-".

6-4. Forward slow tracking preset adjustment

Purpose:
To adjust the timing with which the brake pulse of the capstan motor is generated during slow play so that noise is minimum.

Fault due to incomplete adjustment:
Noise appears during slow play and the picture is not clear.

Test Equipment/Jigs and Connection Points
Monitor TV : Video output jack
Color bar generator: Video input jack
Blank tape (T-120)

State of VCR
Slow tracking: Unplug the power cord to set the slow tracking to the center.

Adjustment Point
CHANNEL △ (S2708)
CHANNEL ▽ (S2709)

Adjustment Procedure
1) Record a signal on the middle of a T-120 blank tape in the EP mode and play it back using the same VCR.
2) Press the "1"and "4" buttons of the remote control provided simultaneously and hold them, then press the "PLAY"(S2701) button of the VCR to set the VCR to the forward slow test mode.
3) Use the CHANNEL buttons so the slow feed noise appears across the bottom of the monitor screen and then it is driven out from the bottom of the screen.
4) Check that no noise appears on the monitor screen.
5) Press the "PLAY" button to return the VCR to the playback mode (the preset data is written to the EEPROM).
6) Perform the same procedure for SP slow tracking preset adjustment.
Do not press the reset switch after adjustment when the power is not turned on as the preset value could drift. If the preset value drifts, turn the power on and press the reset switch again for recovery.

6-5. Reverse slow tracking preset adjustment

Purpose:
To adjust the timing with which the brake pulse of the capstan motor is generated during reverse slow play so that noise is minimum.

Fault due to incomplete adjustment:
Noise appears during reverse slow play and the picture is not clear.

Test Equipment/Jigs and Connection Points
Monitor TV : Video output jack
Color bar generator: Video input jack
Blank tape (T-120)

State of VCR
Slow tracking: Unplug the power cord to set the slow tracking to the center.

Adjustment Point
CHANNEL △ (S2708)
CHANNEL ▽ (S2709)

Adjustment Procedure
1) Record a signal on the middle of a T-120 blank tape in the EP mode and play it back using the same VCR.
2) Press the "1" and "4" buttons of the remote control provided simultaneously during still play and hold them, then press the "PLAY" button (S2701) to set the VCR to the reverse slow test mode.
3) Use the CHANNEL buttons so the slow feed noise appears across the bottom of the monitor screen and then it is driven out from the bottom of the screen.
4) Check that no noise appears on the monitor screen.
5) Press the "PLAY" button to return the VCR to the playback mode (the preset data is written to the EEPROM).
6) Perform the same procedure for SP reverse slow tracking preset adjustment.
Do not press the reset switch after adjustment when the power is not turned on as the preset value could drift. If the preset value drifts, turn the power on and press the reset switch again for recovery.

7. Audio/MTS Circuit Adjustments

7-1. Hi-Fi audio playback level check

Purpose:
To set the playback level of the Hi-Fi audio signal to the specified value.

Fault due to incomplete adjustment:
The appropriate volume cannot be obtained during playback.

Test Equipment/Jigs and Connection Points
Voltmeter
When checking L-CH:Audio output (L) jack
When checking R-CH:Audio output (R) jack
Hi-Fi alignment tape (24HMAF-2)

State of VCR
Play Hi-Fi alignment tape.

Adjustment procedure
Use the same checking procedure for both the L and R channels.
Check that the voltmeter reads -7.8dBs ± 2.0dBs.
If it cannot be confirmed, check the playback signal system.

7-2. MTS input level adjustment (Fig. 6)

Purpose:
To set the level of the MTS signal supplied to the MTS processor in IC1801 from the tuner/IF to the specified level.

Fault due to incomplete adjustment:
1) The S/N deteriorates or distortion becomes conspicuous.
2) Stereo separation deteriorates.

Test Equipment/Jigs and Connection Points
MTS sound signal generator: IN FORM ANT
Voltmeter: PG2509-2

State of VCR
E-E mode

Adjustment Point
RT1801

Adjustment procedure
1) RT1801: Set the reading of the voltmeter to -20.0dBs ± 0.5dBs.

Notes:
MTS sound signal generator settings:
1) Audio frequency: 300Hz
2) Modulation signal: L+R
Monitor TV settings:
1) Press the "GUIDE" button of the remote control to display the menu on the monitor TV screen.
2) Press "2" of the remote control.
3) Press "6" of the remote control to select the SAP option and switch it from OFF to ON.

8. Digital Circuit Adjustments

◆ List of points to be adjusted for replacement of each component:

Replaced component	RT3501 PLL free-run	RT3502 AD timing	RT3553 D-Rec Level
Sub-microprocessor (IC3208) block	—	—	—
Envelope detector (IC3551) block	—	—	—
Digital input/output (IC3601) block	—	—	—
Cylinder assembly	—	Adjust	Adjust
Switching point adjustment	—	Adjust	Adjust
Playback EQ block (DPR PWB)	—	Adjust	Adjust
Others besides playback EQ block (DPR PWB)	—	Adjust	Adjust
Recoding EQ block (DIG PWB)	—	Adjust	Adjust
PLL block (DIG PWB)	Adjust	Adjust	—
AD converter block (DIG PWB)	—	Adjust	—
COB block (DIG PWB)	Adjust	Adjust	Adjust
Power block (DIG PWB)	Adjust	Adjust	Adjust

It is not necessary to perform digital circuit adjustments when replacing components other than the above.

8-1. PLL free-run frequency adjustment (Fig. 7)

Purpose:
To adjust the free-running frequency of clock signal for AD conversion output from the PLL IC.

Fault due to incomplete adjustment:
The clock and data input to the AD converter are not synchronized, and normal D-VHS playback is impossible.

Test Equipment/Jigs and Connection Points
Frequency counter: PG3516-3 (ADCK)

State of VCR
Set to the D-VHS test mode.

Adjustment Point
RT3501

Adjustment procedure
1) Holding down the "1" and "4" buttons of the remote control simultaneously in the eject state, press the "EJECT" button of the VCR to set to the D-VHS test mode. (The D-VHS LED will flash.)
2) Short PG3516 pins 1 and 4, and pins 2 and 5.
Note:Be careful that shorted pins are not in contact with each other.
3) RT3501: The frequency counter reads 19.14 ± 0.05 MHz.
4) Holding down the "1" and "4" buttons of the remote control simultaneously again in the eject state, press the "EJECT" button of the VCR to release the D-VHS test mode.

8-2. Digital Rec level adjustment (Fig. 7, 8)

Purpose:
To adjust the D-VHS recording signal level.

Fault due to incomplete adjustment:
The cylinder output level drops during D-VHS playback, and normal D-VHS playback is impossible.

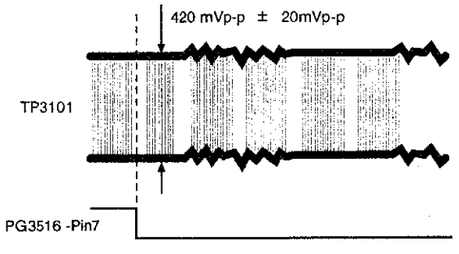
Test Equipment/Jigs and Connection Points
Oscilloscope CH-1: TP3101 [DPR board]
CH-2: PG3516-7 (SWH)[Trigger]
Blank tape (D-VHS)

State of VCR
Set to the D-VHS dubbing mode.

Adjustment Point
RT3553

Adjustment procedure
Caution: Do not connect a monitor TV to the oscilloscope.
1) Load an D-VHS blank tape in the VCR.
Caution: Do not connect the digital A/V cable.
2) Holding down the "DSS/VCR" button of the remote control, press the "STOP" button of the VCR to set to the D-VHS dubbing mode. (The D-VHS LED will light and "dub" will appear in the diaplay.)
Caution: The D-VHS dubbing mode will be released when STOP, PLAY PAUSE, SEARCH, F.FWD, REW or POWER OFF is engaged.
3) Set the VCR to the recording mode.
4) RT3553: Set the amplitude at TP3101 to 420mV ± 20mVp-p.

Waveforms



8-3. AD timing adjustment (Fig. 7)

Purpose:
To adjust the phases of clock and data input to the AD converter.

Fault due to incomplete adjustment:
Normal D-VHS playback is impossible.

Test Equipment/Jigs and Connection Points
Frequency counter: PG3516-6 (C1F)
Oscilloscope CH-1: PG3516-6 (C1F)
CH-2: TP3501 (PB OUT)
PG3516-7 (SWH)[Trigger]
Blank tape (D-VHS)

State of VCR
Set to the D-VHS dubbing mode.

Adjustment Point
RT3502

Adjustment procedure
1) Load an D-VHS blank tape in the VCR.
Caution: Do not connect the digital A/V cable.
2) Holding down the "DSS/VCR" button of the remote control, press the "STOP" button of the VCR to set to the D-VHS dubbing mode. (The D-VHS LED will light and "dub" will appear in the display.)
Caution: The D-VHS dubbing mode will be released when STOP, PLAY PAUSE, SEARCH, F.FWD, REW or POWER OFF is engaged.)
3) Using the VCR, record for approx. 5 minutes, and play back the recorded section.
4) Press the "CHANNEL △, ▽" buttons of the VCR to set the minimum TP3501 output amplitude to 300 ± 20 mVp-p. (See Fig.A)
5) Connect a frequency counter and oscilloscope to PG3516 pin 6.
6) RT3502: Minimize the reading on the frequency counter and the number of pulses on the oscilloscope. (See Fig.B)
Make sure that the frequency counter reads less than 1000Hz.
7) Eject the alignment tape, and reinsert it to activate auto tracking.
8) Make sure that the frequency counter reads less than 50Hz.

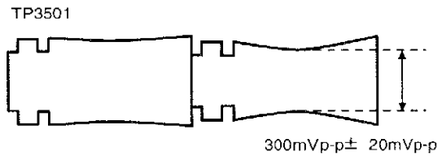


Fig. A

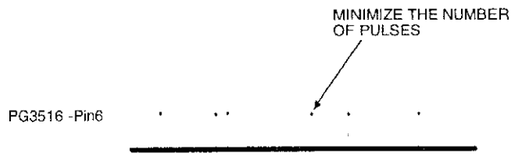


Fig. B

9. List of Hidden Commands

The following tables list the mode setting commands during adjustment and EEPROM initial setting commands.

9-1. Mode setting commands during adjustment

Item	Mode in which command is accepted	Operation	Remarks
Tracking center	Play	Press the "1" and "4" buttons of the remote control simultaneously.	
X-value adjustment test mode	Play	Press the "1" and "4" buttons of the remote control simultaneously and press the "CHANNEL ▽" button on the VCR.	"tESt" appears
Forward slow test mode	Play	Press the "1" and "4" buttons of the remote control simultaneously and press the "PLAY" button on the VCR.	"SLOW" appears
Reverse slow test mode	Still play	Press the "1" and "4" buttons of the remote control simultaneously and press the "PLAY" button on the VCR.	"-SLOW" appears
D-VHS Test mode	Eject	Press the "1" and "4" buttons of the remote control simultaneously and press the "EJECT" button on the VCR.	"D-VHS" flashes

9-2. EEPROM initialization commands

Item	Mode in which command is accepted	Operation	Remarks
Shipment mode initial setting	EJECT	Press the "REC" button on the VCR and hold it, then press the "RESET" button used to initialize the microprocessor.	Hold the "REC" button depressed and release it after the display lights.
Clearing of trouble display	———	Press the "PLAY" button on the VCR and hold it, then press the "RESET" button used to initialize the microprocessor.	Hold the "PLAY" button depressed and release it after the display lights.

10. List of Data in EEPROM and Initial Settings

The table below lists the data stored in ROM. It also shows the data set by shipment mode initialization and when the trouble display is cleared.

Information	Data memory ROM	List of initial data	
	IC903 VCR EEPROM	Shipment mode initial data	Clearing of trouble display
Tuned channel data	Yes	Yes	No
VCR mode select data	Yes	Yes	No
Trouble display data	Yes	Yes	Yes
Slow tracking data	Yes	No (set by adjust)	No
Switching point data	Yes	No (set by adjust)	No

11. Initial Settings of IC903 (VCR EEPROM)

The following shows the on-screen display and modes of switches when IC903 (EEPROM) is initialized.

[A] D-VHS SETUP MENU (in menu)
1 D-VHS AUTO MODE [ON]
[B] VCR SETUP MENU (in menu)
1 AUTO BLUE [OFF]
4 AUDIO SETUP [Hi-Fi]
5 AUDIO SETUP [STEREO]
6 AUDIO SETUP [SAP OFF]
[C] CHANNEL PRESET (in menu)
1 CHANNEL [CATV1]
[D] Other modes
Recording speed : EP
[E] Front panel switch
ANT. OUT : RFCH 03

12. Caution When Replacing IC903 (VCR EEPROM)

After replacing IC903 (VCR EEPROM), execute the VCR initial settings and then perform the following adjustments.

	Adjustment	Page
1	Forward slow tracking adjustment	P3-5
2	Reverse slow tracking adjustment	P3-6

HITACHI

VT-DX815A Supplement

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